

DTIC FILE COPY

AFGL-TR-87-0162

NCAR/TN-276+STR  
NCAR TECHNICAL NOTE

February 1987

The Fe XIV Solar Corona  
at 5303 Angstroms:

An Atlas of Synoptic Charts from the  
Sacramento Peak Coronal Photometer  
May 1973-December 1985

AD-A181 938

DTIC  
ELECTED  
S JUN 11 1987 D  
D

R.C. Altrock, Air Force Geophysics Laboratory  
L.B. Gilliam, National Optical Astronomy Observatories,  
National Solar Observatory/Sacramento Peak, Sunspot, NM  
D.G. Sime  
R.R. Fisher

APPROVED FOR PUBLIC RELEASE; DISTRIBUTION UNLIMITED.

HIGH ALTITUDE OBSERVATORY

NATIONAL CENTER FOR ATMOSPHERIC RESEARCH  
BOULDER, COLORADO

## NCAR TECHNICAL NOTES

The Technical Note series provides an outlet for a variety of NCAR manuscripts that contribute in specialized ways to the body of scientific knowledge but which are not suitable for journal, monograph, or book publication. Reports in this series are issued by the NCAR Scientific Divisions; copies may be obtained on request from the Publications Office of NCAR. Designation symbols for the series include:

**EDD - *Engineering, Design, or Development Reports***

Equipment descriptions, test results, instrumentation, and operating and maintenance manuals.

**IA - *Instructional Aids***

Instruction manuals, bibliographies, film supplements, and other research or instructional aids.

**PPR - *Program Progress Reports***

Field program reports, interim and working reports, survey reports, and plans for experiments.

**PROC - *Proceedings***

Documentation of symposia, colloquia, conferences, workshops, and lectures. (Distribution may be limited to attendees.)

**STR - *Scientific and Technical Reports***

Data compilations, theoretical and numerical investigations, and experimental results.

The National Center for Atmospheric Research is operated by the University Corporation for Atmospheric Research and is sponsored by the National Science Foundation. Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

Unclassified

SECURITY CLASSIFICATION OF THIS PAGE

AD-A181 938

Form Approved  
OMB No. 0704-0188

REPORT DOCUMENTATION PAGE			
1a. REPORT SECURITY CLASSIFICATION Unclassified		1b. RESTRICTIVE MARKINGS	
2a. SECURITY CLASSIFICATION AUTHORITY		3. DISTRIBUTION/AVAILABILITY OF REPORT	
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE		Approved for public release; Distribution unlimited	
4. PERFORMING ORGANIZATION REPORT NUMBER(S)  AFGL-TR-87-0162		5. MONITORING ORGANIZATION REPORT NUMBER(S)	
6a. NAME OF PERFORMING ORGANIZATION Air Force Geophysics Laboratory	6b. OFFICE SYMBOL (If applicable) PHS	7a. NAME OF MONITORING ORGANIZATION	
6c. ADDRESS (City, State, and ZIP Code) Hanscom AFB Massachusetts 01731		7b. ADDRESS (City, State, and ZIP Code)	
8a. NAME OF FUNDING/SPONSORING ORGANIZATION	8b. OFFICE SYMBOL (If applicable)	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER	
8c. ADDRESS (City, State, and ZIP Code)		10. SOURCE OF FUNDING NUMBERS	
		PROGRAM ELEMENT NO. 61102F	PROJECT NO. 2311
		TASK NO. G3	WORK UNIT ACCESSION NO. 24
11. TITLE (Include Security Classification) The Fe XIV Solar Corona at 5303 Angstroms: An Atlas of Synoptic Charts From the Sacramento Peak Coronal Photometer. May 1973-December 1985			
12. PERSONAL AUTHOR(S) R. C. Altrock, L.B. Gilliam*; D.G. Sime**; R.R. Fisher**			
13a. TYPE OF REPORT REPRINT	13b. TIME COVERED FROM _____ TO _____	14. DATE OF REPORT (Year, Month, Day) 1987 June 1	15. PAGE COUNT
16. SUPPLEMENTARY NOTATION Reprinted from Nat'l Center for Atmospheric Research, Tech Note 276+STR, Feb 1987. * Nat'l Optical Astronomy Observatories, Nat'l Solar Observatory, Sacramento Peak, Sunspot, NM; ** High Altitude Observatory, Boulder, CO			
17. COSATI CODES		18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number) Solar corona Solar synoptic charts Solar Fe XIV	
19. ABSTRACT (Continue on reverse if necessary and identify by block number)			
SEE REVERSE FOR ABSTRACT			
20. DISTRIBUTION/AVAILABILITY OF ABSTRACT <input type="checkbox"/> UNCLASSIFIED/UNLIMITED <input type="checkbox"/> SAME AS RPT. <input type="checkbox"/> DTIC USERS		21. ABSTRACT SECURITY CLASSIFICATION Unclassified	
22a. NAME OF RESPONSIBLE INDIVIDUAL R. C. Altrock		22b. TELEPHONE (Include Area Code)	22c. OFFICE SYMBOL AFGL/PHS

---

Synoptic photoelectric observations of the solar corona in the emission from the green line (5303Å) of Fe XIV were begun at the Sacramento Peak Observatory in June 1973 and continue to the present. The observations made during this program provide a record of the distribution and brightness of the hotter regions of the corona ( $1.8 \times 10^6$  K) over an entire solar cycle. As such, the green line data may provide a link between the active regions of the chromosphere and the large scale structure of the corona. In order to allow comparison of these data with other observations of the sun and corona, we present here an atlas of the green line measurements in the same format as that used to display the white light coronal structure recorded by the High Altitude Observatory's K-coronameters on Mauna Loa, in previously published atlases. It is our intent that this atlas be brought up to date periodically as the observations permit.

February 1987

**The Fe XIV Solar Corona  
at 5303 Angstroms:  
An Atlas of Synoptic Charts from the  
Sacramento Peak Coronal Photometer  
May 1973-December 1985**

R.C. Altrock, Air Force Geophysics Laboratory

L.B. Gilliam, National Optical Astronomy Observatories,  
National Solar Observatory/Sacramento Peak, Sunspot, NM

D.G. Sime

R.R. Fisher



Accession For	
NTIS	CRA&I <input checked="" type="checkbox"/>
DTIC	TAB <input type="checkbox"/>
Unannounced <input type="checkbox"/>	
Justification .....	
By .....	
Distribution /	
Availability Codes	
Dist	Available / or Special
A-1	

HIGH ALTITUDE OBSERVATORY

NATIONAL CENTER FOR ATMOSPHERIC RESEARCH  
BOULDER, COLORADO

**CONTENTS**

	page
PREFACE	v.
I. INTRODUCTION	1
II. DESCRIPTION OF THE INSTRUMENTATION	2
III. DATA REDUCTION AND PRODUCTS	3
IV. SYNOPTIC MAPS OF THE GREEN LINE CORONA	6
V. REFERENCES	161
ACKNOWLEDGMENTS	162

## PREFACE

Synoptic photoelectric observations of the solar corona in the emission from the green line (5303Å) of Fe XIV were begun at the Sacramento Peak Observatory in June 1973 and continue to the present. The observations made during this program provide a record of the distribution and brightness of the hotter regions of the corona ( $1.8 \times 10^6$  K) over an entire solar cycle. As such, the green line data may provide a link between the active regions of the chromosphere and the large scale structure of the corona. In order to allow comparison of these data with other observations of the sun and corona, we present here an atlas of the green line measurements in the same format as that used to display the white light coronal structure recorded by the High Altitude Observatory's K-coronameters on Mauna Loa, in previously published atlases. It is our intent that this atlas be brought up to date periodically as the observations permit.

R. C. Altrock, L. B. Gilliam

National Solar Observatory,

D. G. Sime, R. R. Fisher

High Altitude Observatory

September 1986.

## I. INTRODUCTION

The purpose of this Note is to describe and present synoptic observations of the solar corona, made over the last solar cycle, in the green Fe XIV line at 5303 Å. This is attempted in a way which displays both individual regions of bright emission and the global properties of the emission. The long string of observations, 1973 to 1984, is divided into and displayed in individual Carrington rotations, allowing the study of the global coronal emission structure at any given time as well as permitting the long term variability in the coronal emission to be seen. Further, the format permits easy comparison with other data sets so that the scientific potential of the observations can be achieved more easily.

Since the green line emission arises in coronal material with temperatures of about  $1.8 \times 10^6$  K it is widely thought to trace out those parts of the corona heated by chromospheric active regions. Solar coronal features of a variety of scales, including coronal holes (Fisher and Musman, 1975), have also been detected in this line, suggesting that the record of green line observations can be viewed in a sense as a synthesis of medium scale chromospheric and semi-global coronal properties. However, the overall relationship of regions which are bright in 5303 Å to other solar coronal structures has never fully been examined. With this Note, we provide a tool to explore this relationship more completely.

The large scale structure of the solar corona as seen in white light has been observed for the last 20 years with a series of K-coronameters operated at the HAO Mauna Loa, Hawaii, site. The data from the last of these instruments (Fisher et al., 1981) have also been displayed in a series of atlases (Fisher et al., 1985) which show the distribution of the coronal white light polarized brightness with latitude and longitude. These data, from which coronal electron density can quite directly be inferred, have been presented in maps displaying one Carrington rotation at a time. Here we present, in the same format, the record of the distribution of the green line radiance in latitude and longitude.

## II. DESCRIPTION OF THE INSTRUMENTATION

The data presented in this Note were gathered with the National Solar Observatory/Sacramento Peak photoelectric coronal photometer operating at the Coudé feed of the 40 cm coronagraph. A mica filter with full width at half maximum (FWHM) of 0.65 Å is presently used to isolate the Fe XIV line at 5303 Å, but up until 1983 January 4, a birefringent filter of FWHM 0.58 Å was used. A piezo-electric modulator is used to chop between the central bandpass and the nearby continuum in order to remove the contribution of the continuum at this wavelength.

Data are collected by means of a scan in position angle at one of a selection of heights above the limb. These heights are usually  $0.15 R_{\odot}$  and  $0.35 R_{\odot}$  with an additional scan at  $0.25$ ,  $0.45$  or  $0.55 R_{\odot}$  as available. Data are gathered at points separated by  $3^{\circ}$  in position angle and a complete scan in position angle takes approximately 5 minutes. In this Note, we present only the data taken at  $1.15 R_{\odot}$ . The data are collected on magnetic tape for later analysis. Control of the instrument and of the data collection was handled initially by a DEC PDP 11-10 computer, and subsequently (after 1982 August 31) by a PE 3220. The instrument and its operation are described more fully by Fisher (1973) and by Smartt (1982). An example of the data collected is shown in Fisher and Musman (1975).

### III. DATA REDUCTION AND PRODUCTS

Daily data scans have been examined for quality and freedom from artifacts and then collected on magnetic tape for further processing. The contents of these tapes, a record of the coronal brightness at 5303Å as a function of position angle at a given height above the limb, have then been reformatted to appear similar to the data collected by the High Altitude Observatory's (HAO's) Mk-III K-coronameter. This allows easy application of much of the software written to manipulate and analyze the white light data. In particular, for this Note the data have been reduced to the synoptic map format by the algorithms originally developed for the HAO synoptic white light coronal data collected at the Observatory's Mauna Loa, Hawaii, observing station.

The format of the display is similar to that used in the recent atlases of the white light data (Fisher et al., 1985). Each day's position angle scan from 0 to 180 degrees is assigned the longitude of the East limb of the sun for the time of the observation. The data are then inserted at the appropriate position in a rectangular grid representing solar latitude and longitude, organized into Carrington rotations. Similarly, the other part of the scan, from 180 to 360 degrees, is used to construct a map based on observations of the west limb.

The data are shown in the following section as rectangular maps for each Carrington rotation from May 1973 to December 1985. The data thus span Carrington rotations 1601 to 1770, except for rotations 1612 and 1629, which are missing. East limb data only are available for the interval covered by rotations 1601 to 1611, and while the data are rather sparse for other periods in 1974, 1975, and 1976, maps have been included in order to give a sense of the continuity, slow evolution and low intensity in the emission line corona. Special care should be taken in interpreting these data (see below).

The map based on East limb observations is shown at the top of the page, while that for West limb data appears at the bottom of the page. The day number of limb passage for each observation is indicated below the maps in the appropriate location, while days when no data are present are marked by a cross instead of a day number. For simplicity, only even day numbers are shown, although every day on which no data are available is indicated.

Note that where data are absent, the contour plotting routine has been allowed to interpolate across the gap in order to preserve some indication of the nearby large scale structure. An exception occurs when a data gap exists near the end of a calendar year. In such a case, no interpolation is carried out and a gap appears on the synoptic charts. These periods should be used *only with great caution* and, especially when comparisons are made to other solar data, care should be taken to see that data actually exist. However, in spite of these periods of sparse data coverage and the difficulties outlined below, we believe the maps give a reasonable indication of the true distribution of brightness in the corona. On each page, a legend is shown which gives the values of radiance in the observing bandpass (in millionths of the brightness of the solar disc at 5303 Å) for each of the shading and contour levels shown on that page. Readers who desire more specific information on the observations for any particular day are referred to Altrock and Gilliam (1985).

*Notes on the Interpretation of NSO/SP Coronal Photometer Data*

*General Comments*

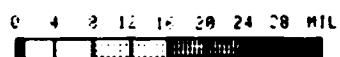
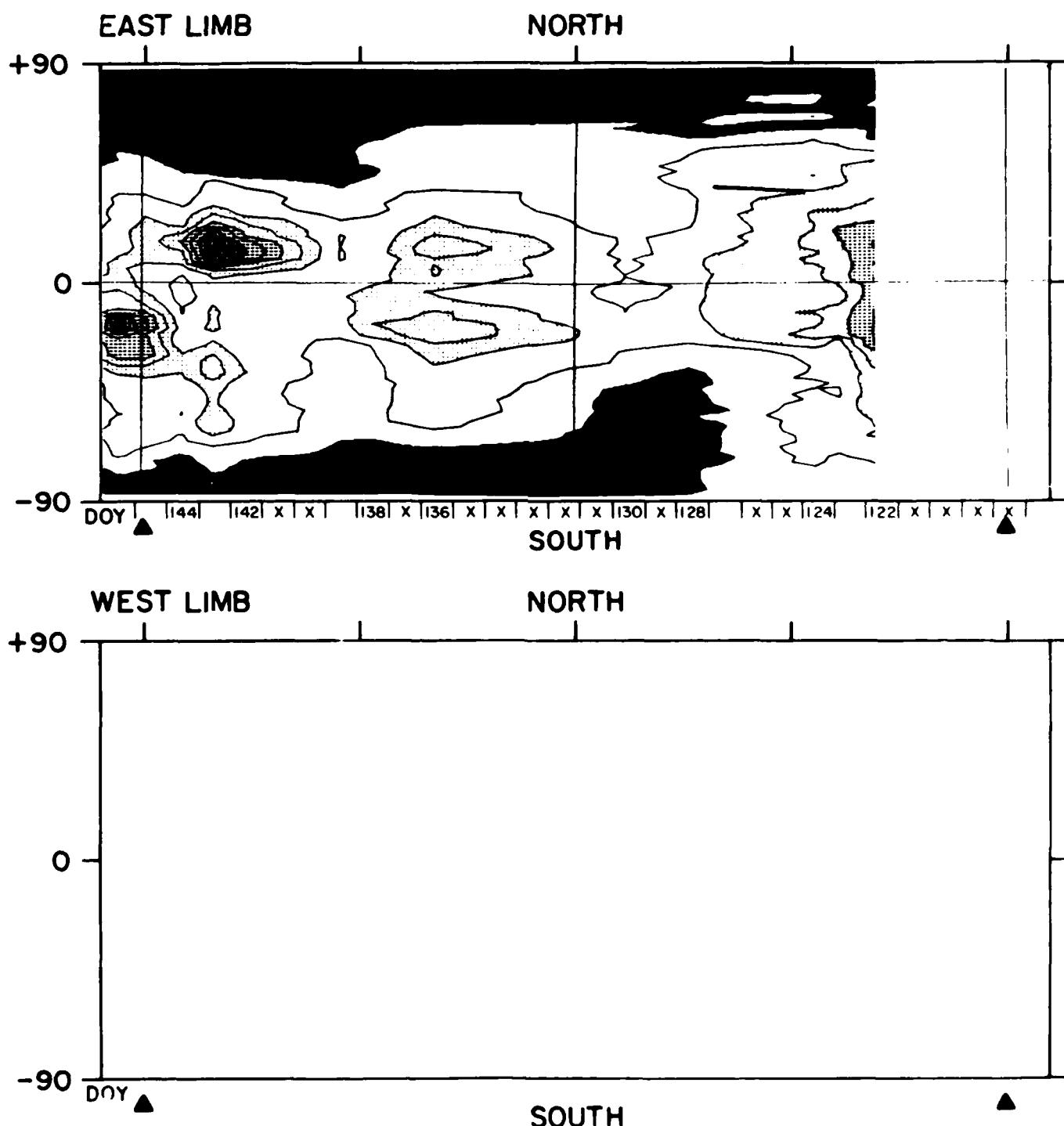
- (1) Occasional discontinuities occur near geographic South as a result of clouds' causing suspension of the observations. This occurs mainly in observations prior to 1976.
- (2) Although the system appears to be stable, early data (up through 1982) suffer from too infrequent calibration. Calibration was done only every few months. Daily transparency changes were ignored, and this causes intensities to be too low for scans taken early or late in the day and during episodes of volcanic dust pollution, etc. In addition, telescope polarization varies diurnally from 0 to 12%, and these variations may affect the data. Since 1982, calibrations have been done each day with the scans whenever possible and the data are corrected for changes in light level between the time of the scan and the calibration.
- (3) Under conditions of excessive scattering, due to contamination on the objective lens, or possibly sky conditions, the data suffer from an East-West asymmetry. The East limb data are biased to be too bright. Conversely, the West limb observations are too dark. The

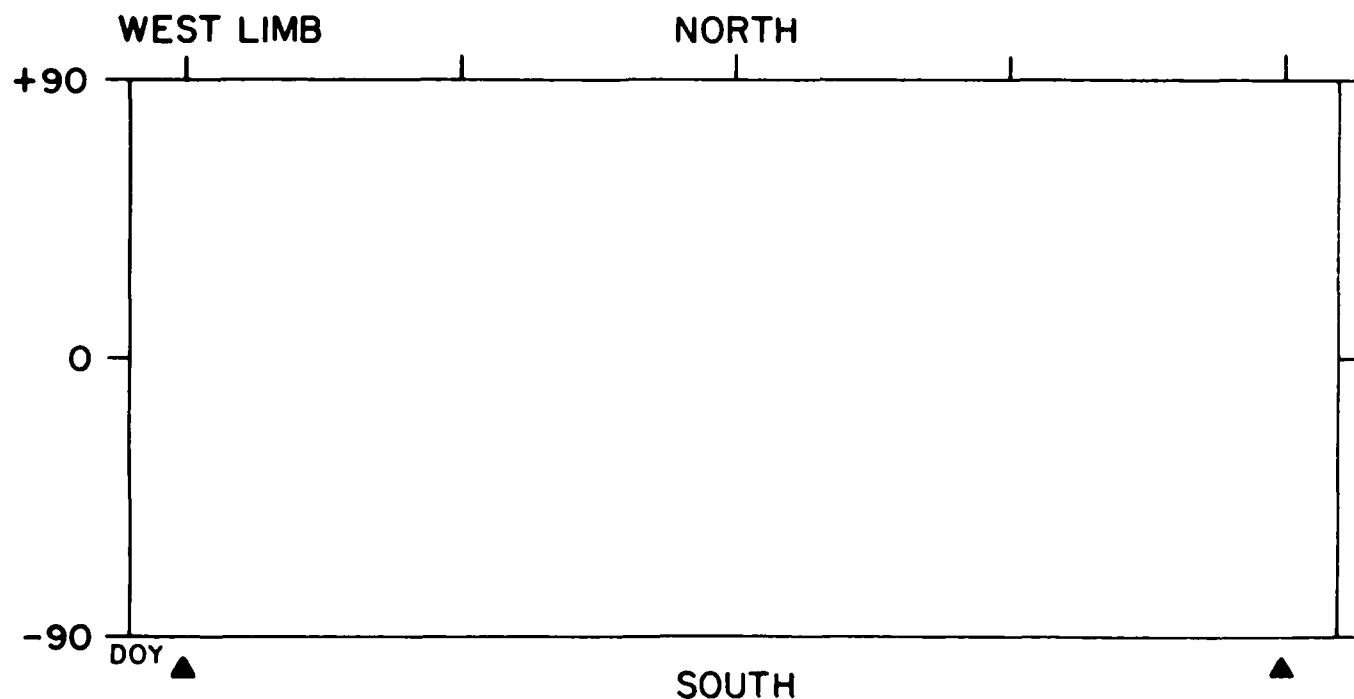
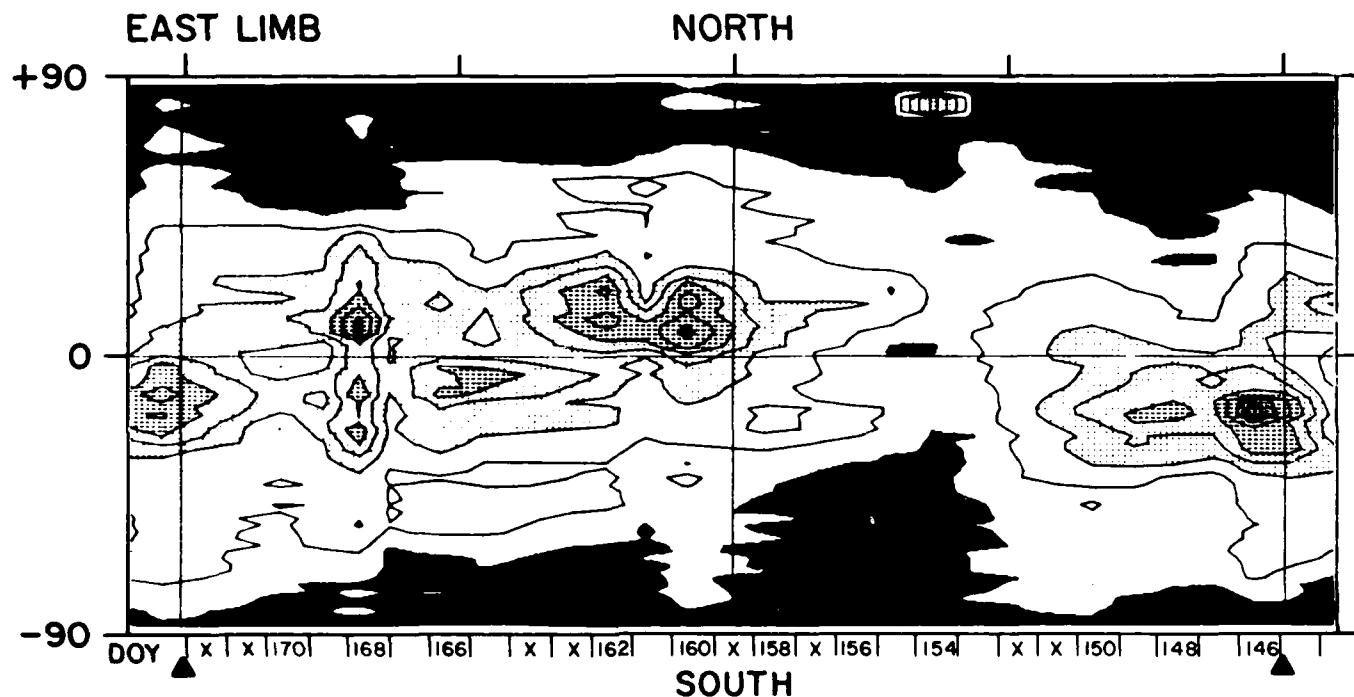
practical effect on the West limb observations is more marked, because the A/D converter does not accept values less than a zero level set by the observer. Thus, West limb data in these situations appear to be clipped. Intervals when this was a particular problem are noted below.

*Specific Comments*

- 1973-1974: Calibration may be wrong by 50%; West limb scans are of doubtful value.
- 1975-1978: Radius errors through August 1978—a constant (incorrect) solar radius was used, resulting in an annual variation of the height at which data were recorded. For example, scans labelled 1.15 were actually recorded from 1.16 in January to 1.20 in July. This can cause intensities in July to be as much as 30% too low, based on an  $r^{-7.6}$  variation.
- 1977: Severe excessive scatter DOY 220 through 258.
- 1978: Severe excessive scatter DOY 178 through 180.
- 1980-1983: Error in ephemeris program—radius errors of order  $< 0.01 R_{\odot}$  will affect intensities by a few percent due to incorrect year being entered in ephemeris call.

**IV. SYNOPTIC MAPS OF THE GREEN LINE CORONA**

**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK****Fe XIV, 5303 Å CORONAL PHOTOMETER****ROTATION 1601    HEIGHT 1.15 R<sub>⊕</sub>    YEAR 1973****X = NO DATA**

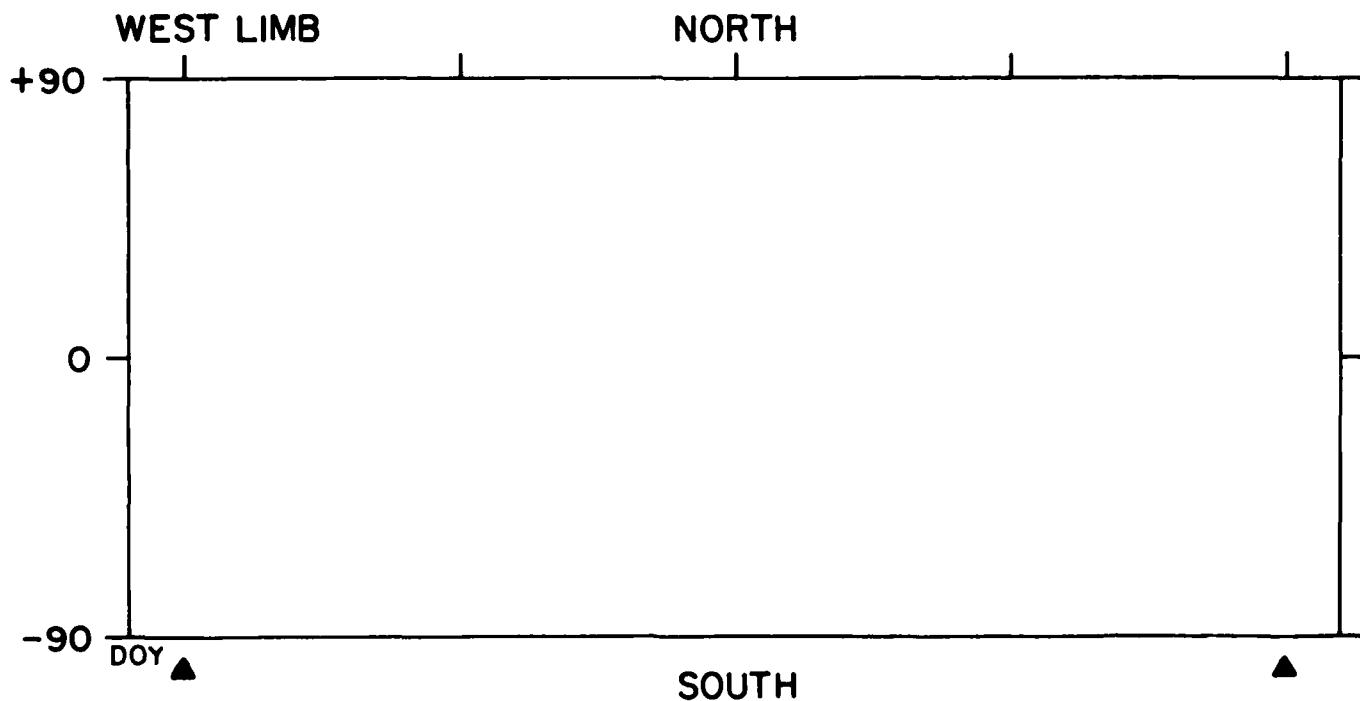
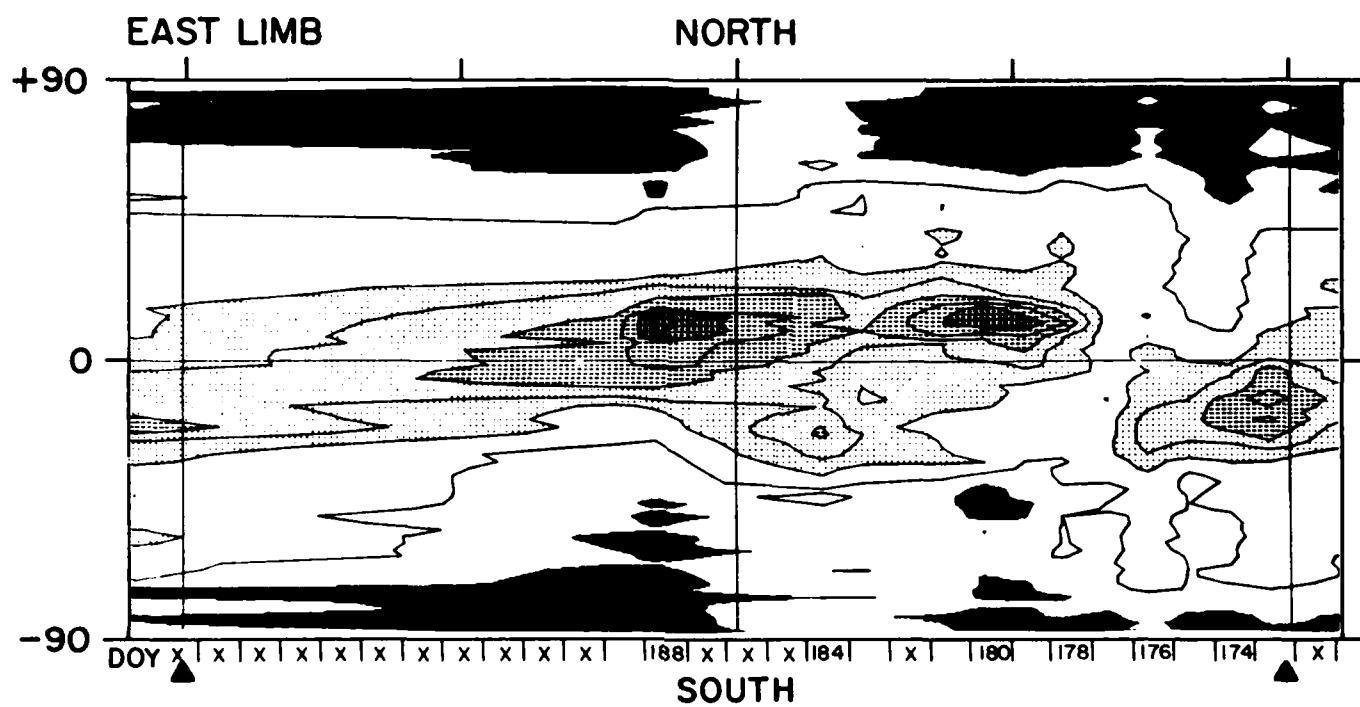
**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK****Fe XIV, 5303 Å CORONAL PHOTOMETER****ROTATION 1602 HEIGHT 1.15 R<sub>o</sub> YEAR 1973**

X = NO DATA

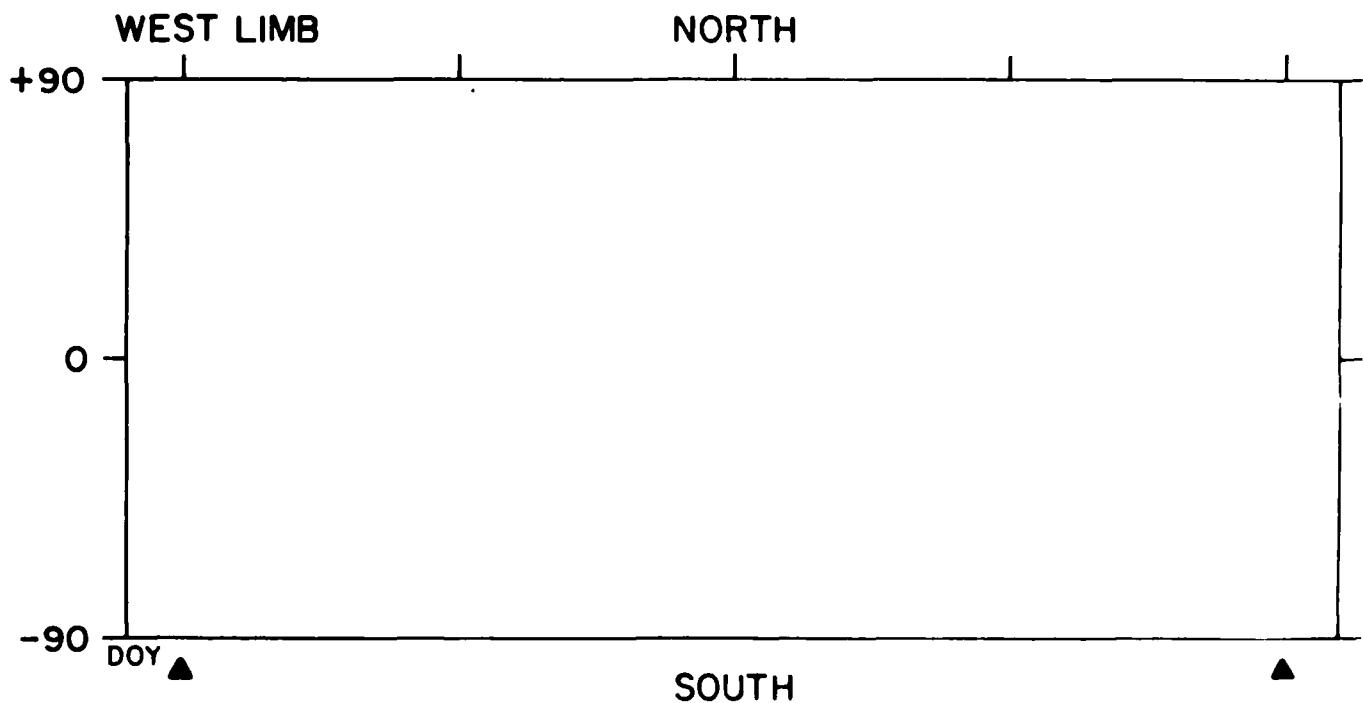
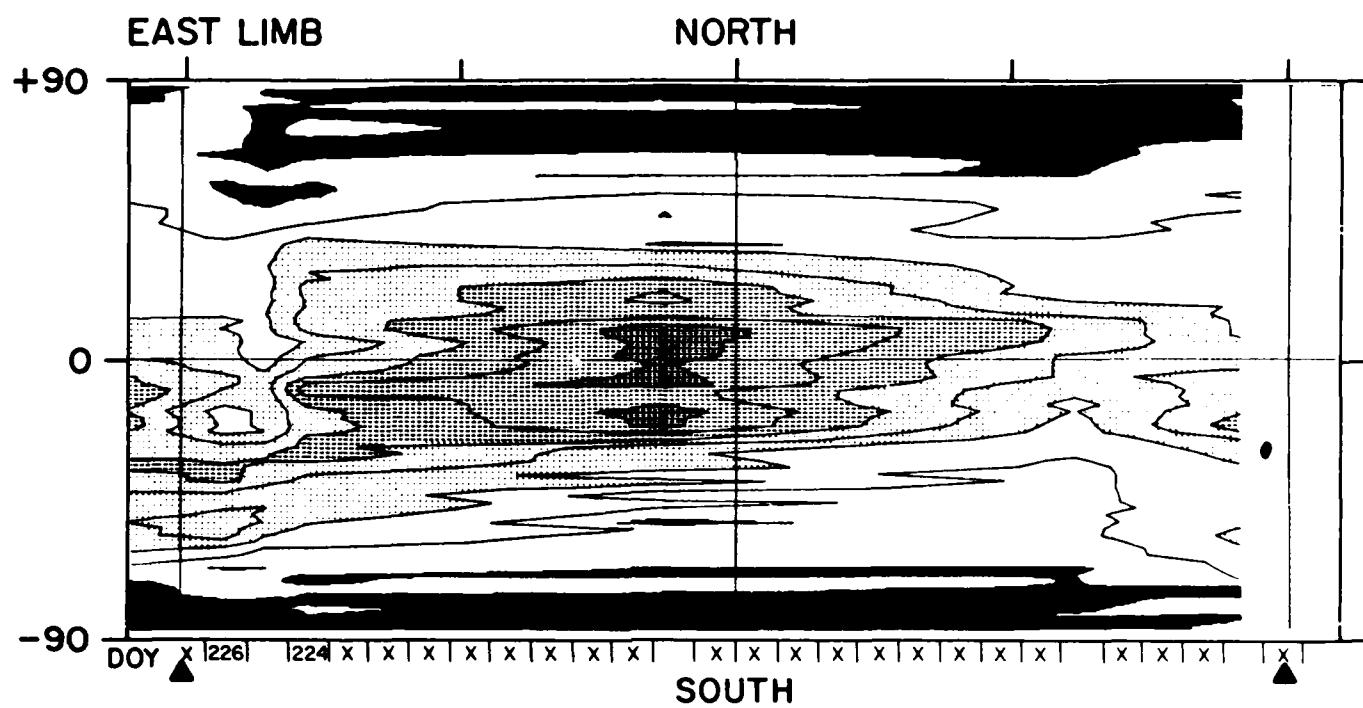
# NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1603 HEIGHT 1.15 R<sub>o</sub> YEAR 1973

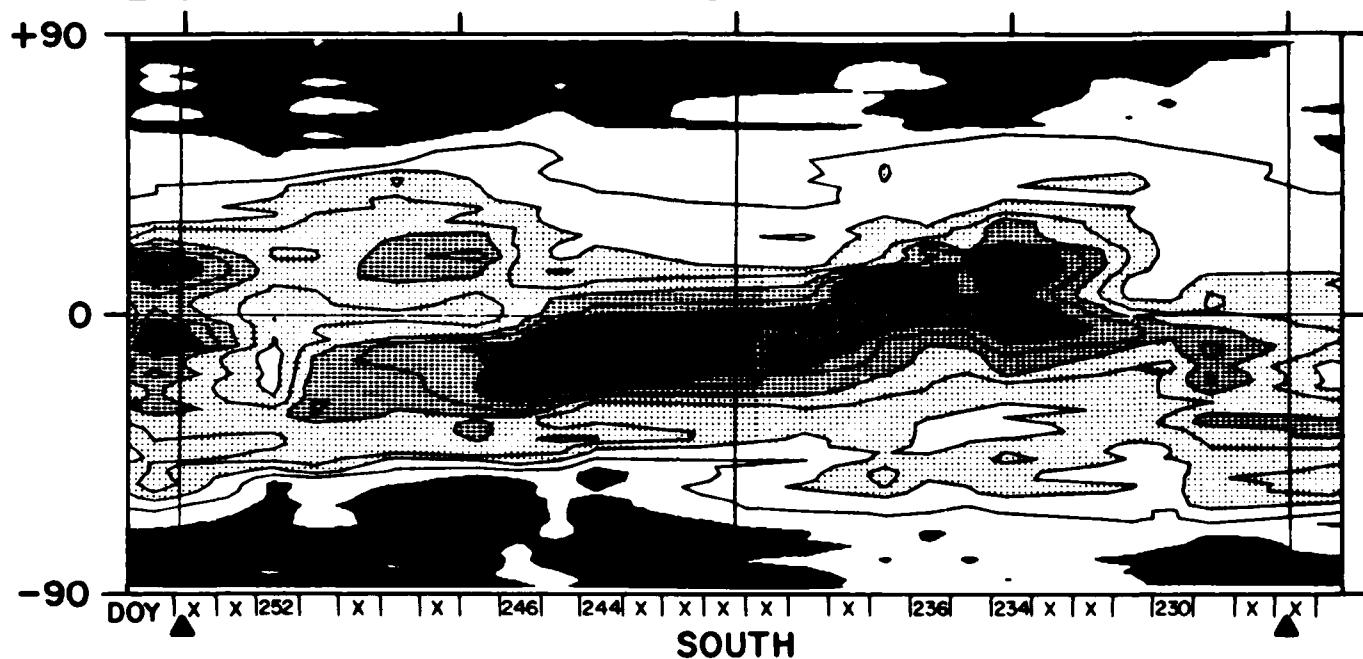
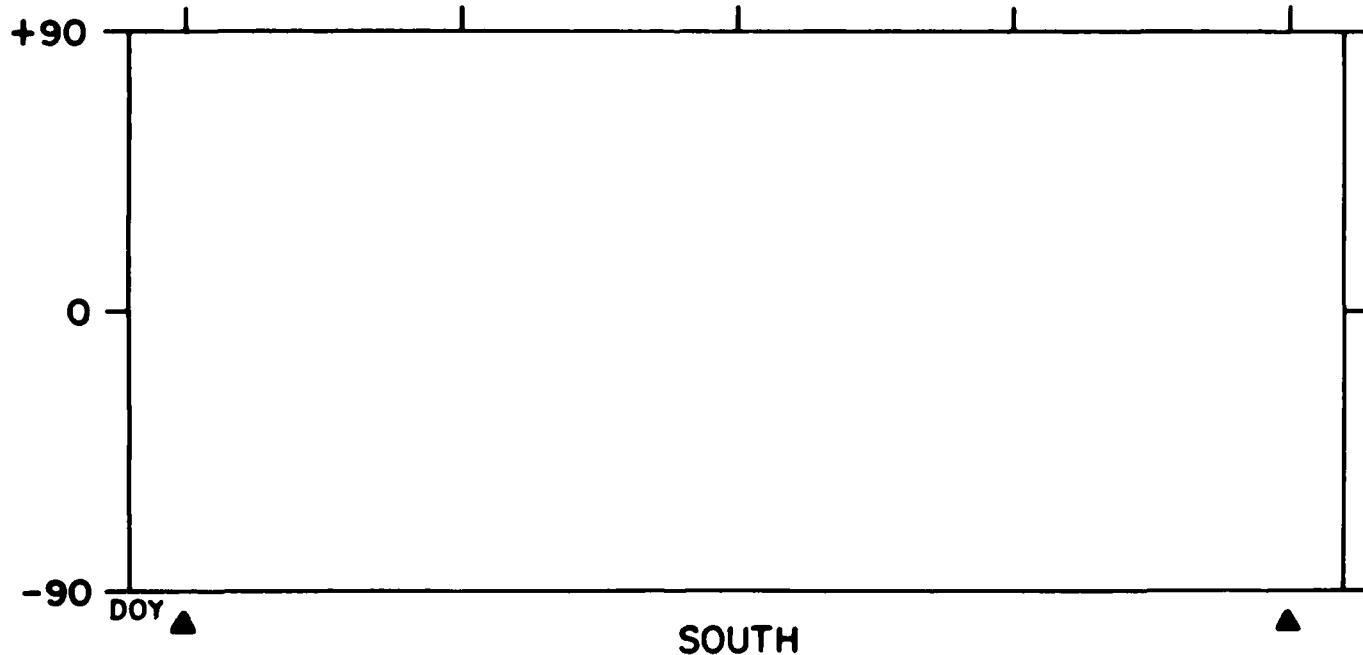


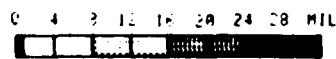
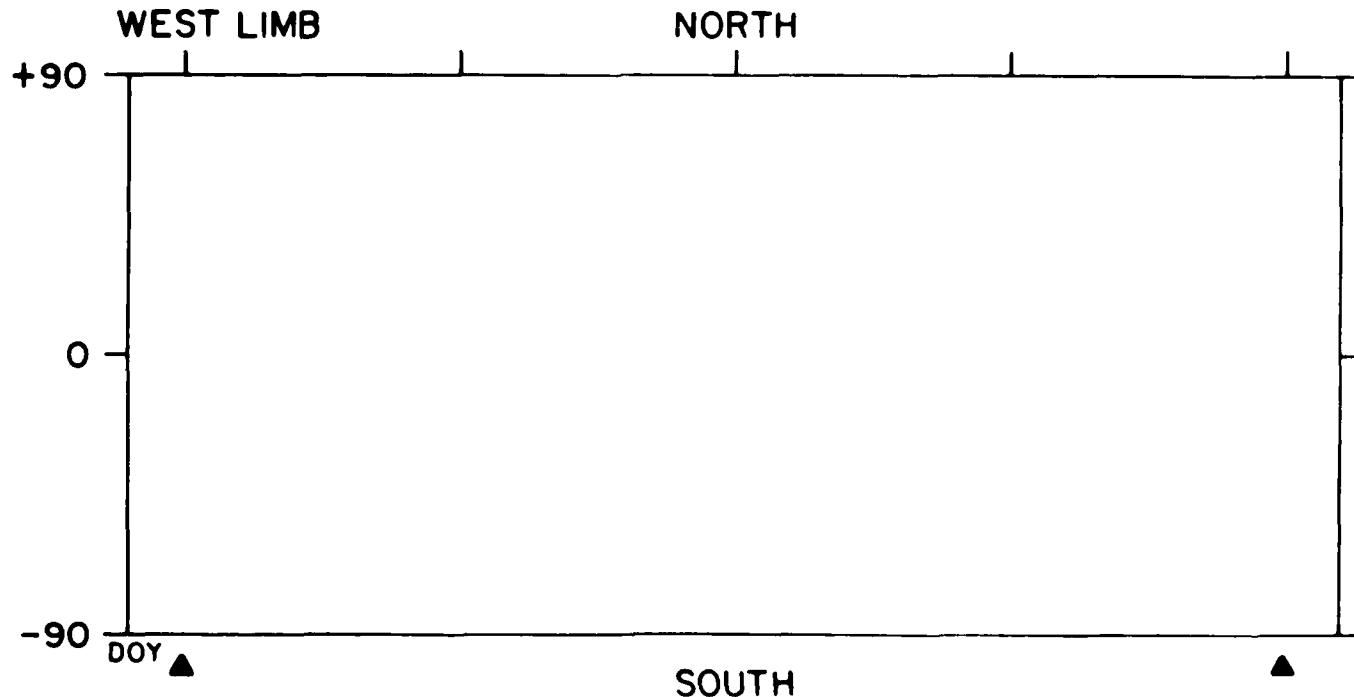
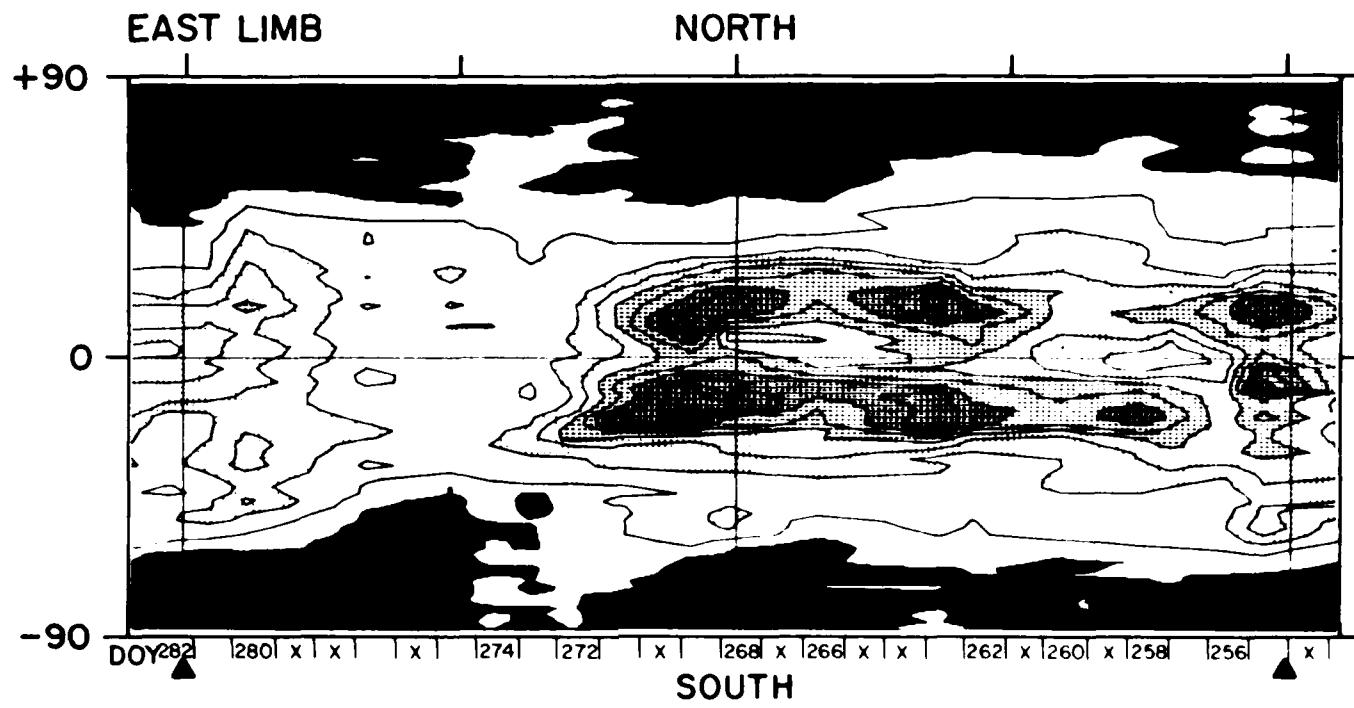
X = NO DATA

**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK****Fe XIV, 5303 Å CORONAL PHOTOMETER****ROTATION 1604 HEIGHT 1.15 R<sub>o</sub> YEAR 1973**

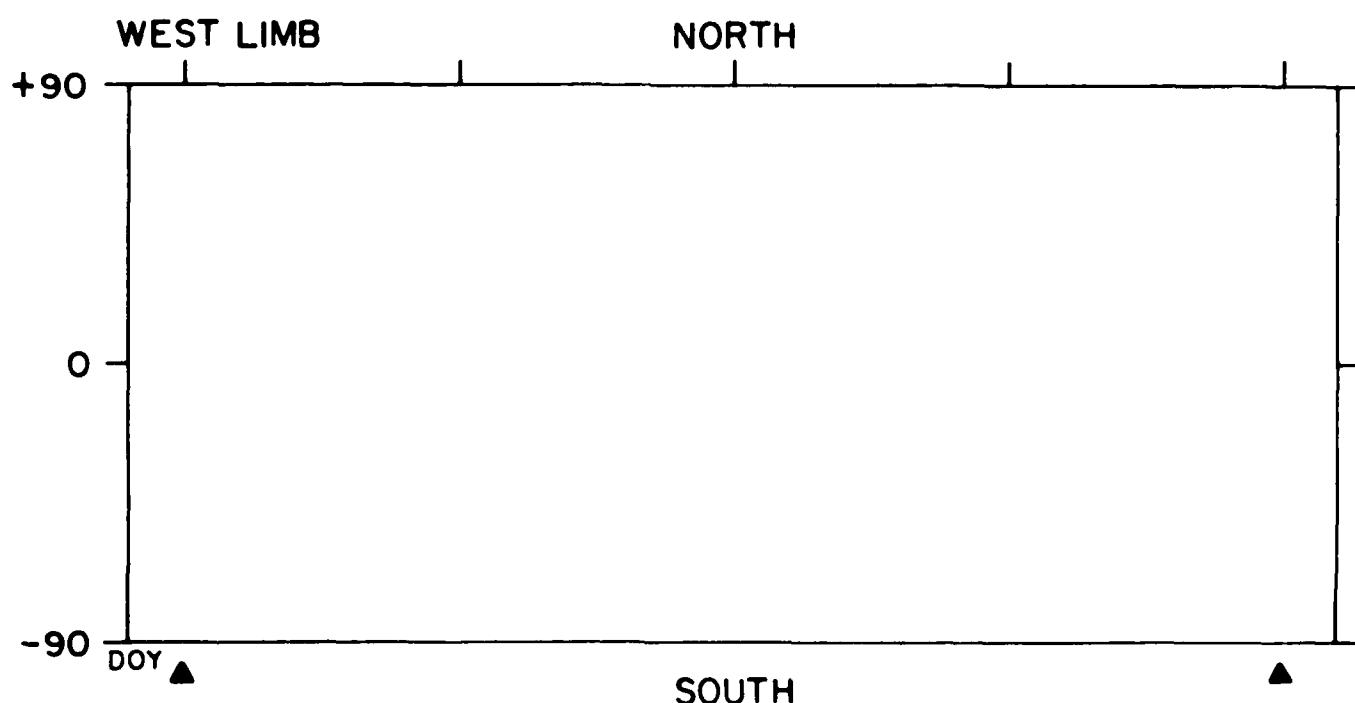
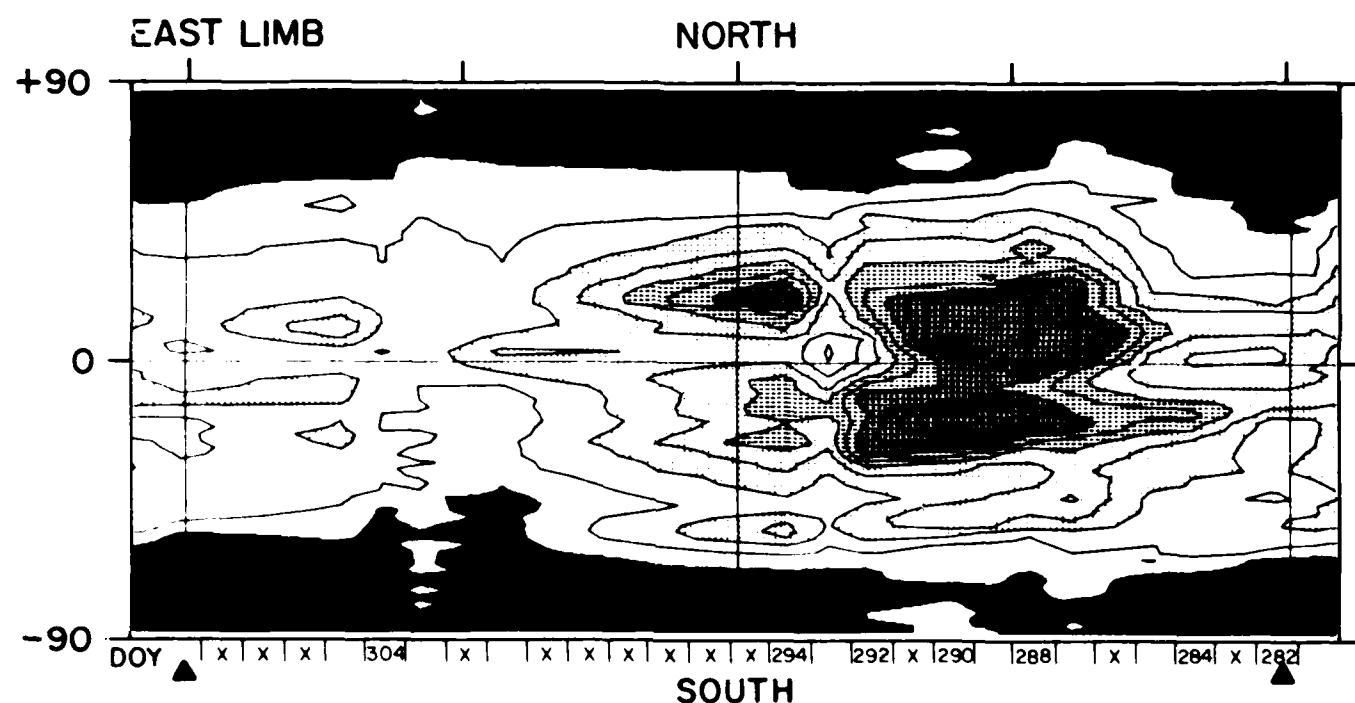
0 4 8 12 16 20 24 28 MIL

X = NO DATA

**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK****Fe XIV, 5303 Å CORONAL PHOTOMETER****ROTATION 1605 HEIGHT 1.15 R<sub>•</sub> YEAR 1973****EAST LIMB****NORTH****WEST LIMB****NORTH****X = NO DATA**

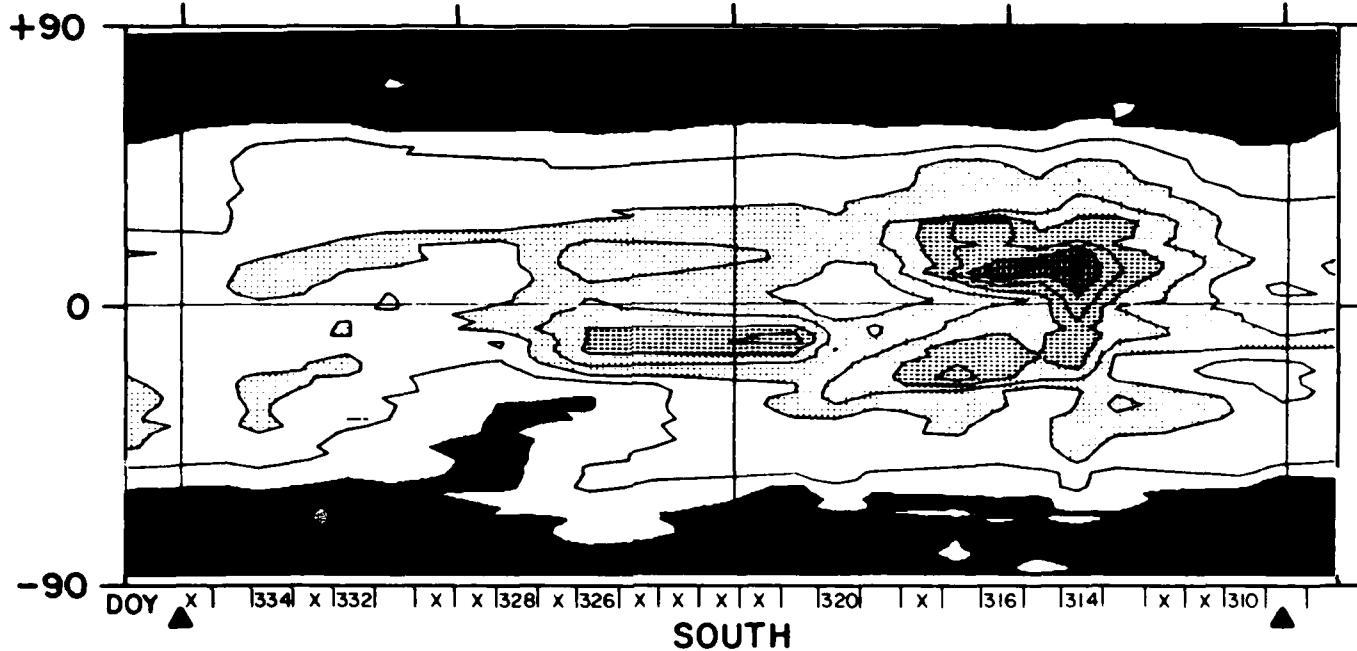
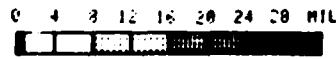
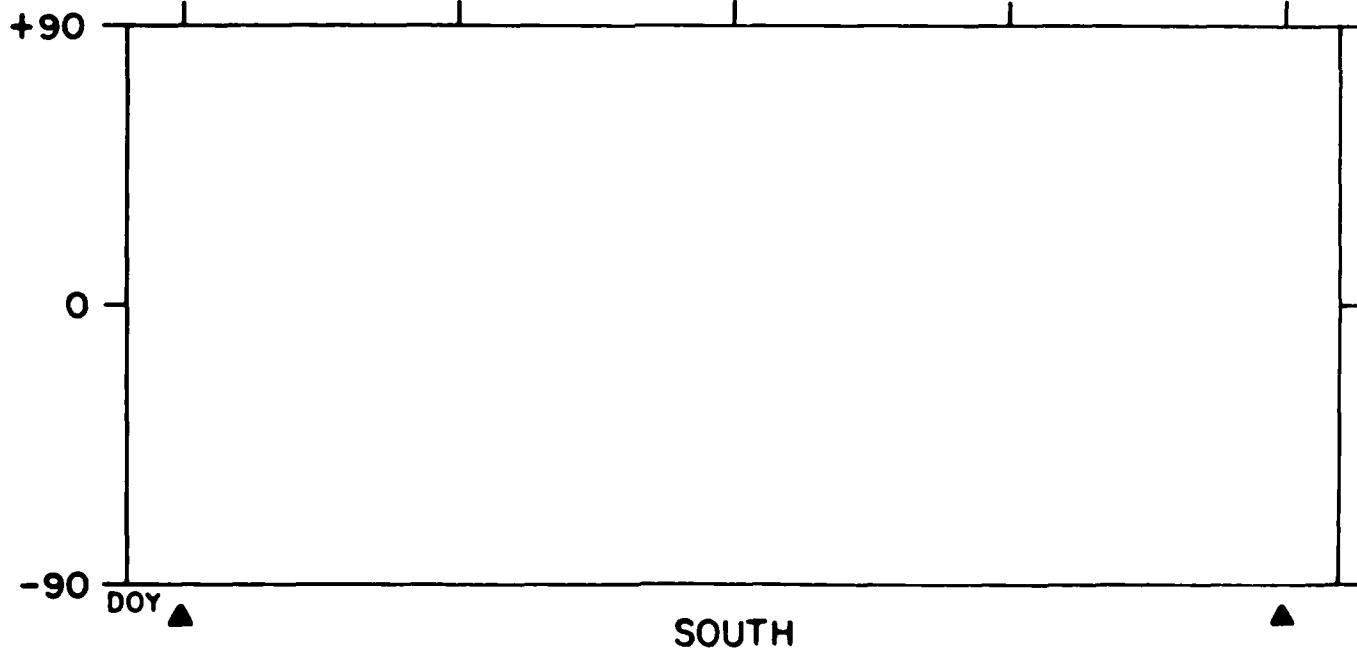
**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK****Fe XIV, 5303 Å CORONAL PHOTOMETER****ROTATION 1606 HEIGHT 1.15 R<sub>⊕</sub> YEAR 1973**

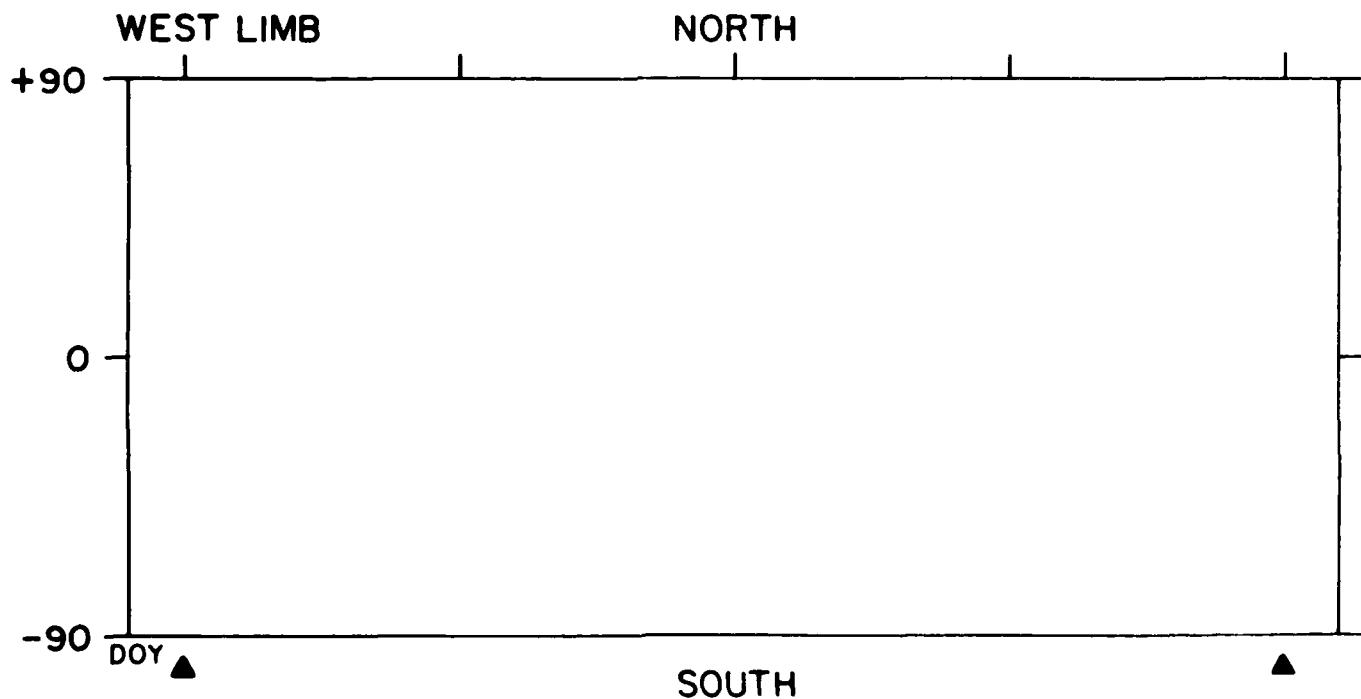
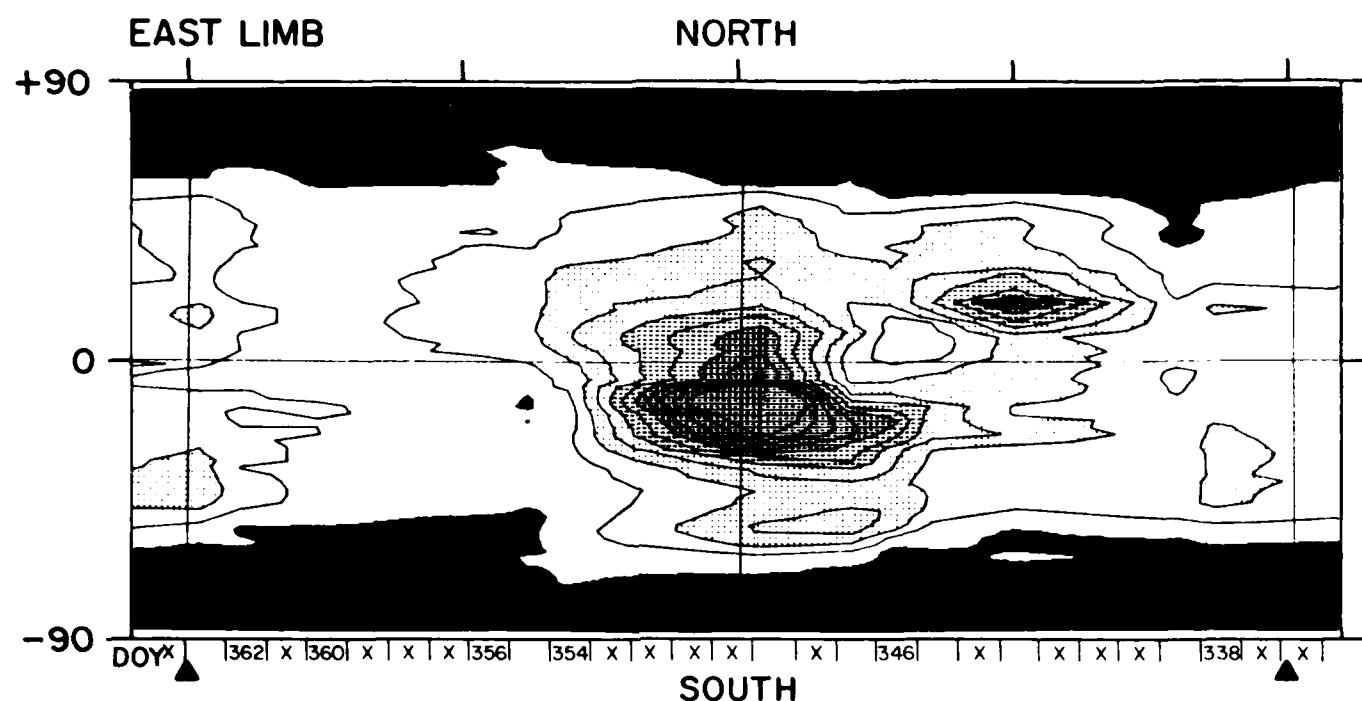
X = NO DATA

**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK****Fe XIV, 5303 Å CORONAL PHOTOMETER****ROTATION 1607 HEIGHT 1.15 R<sub>o</sub> YEAR 1973**

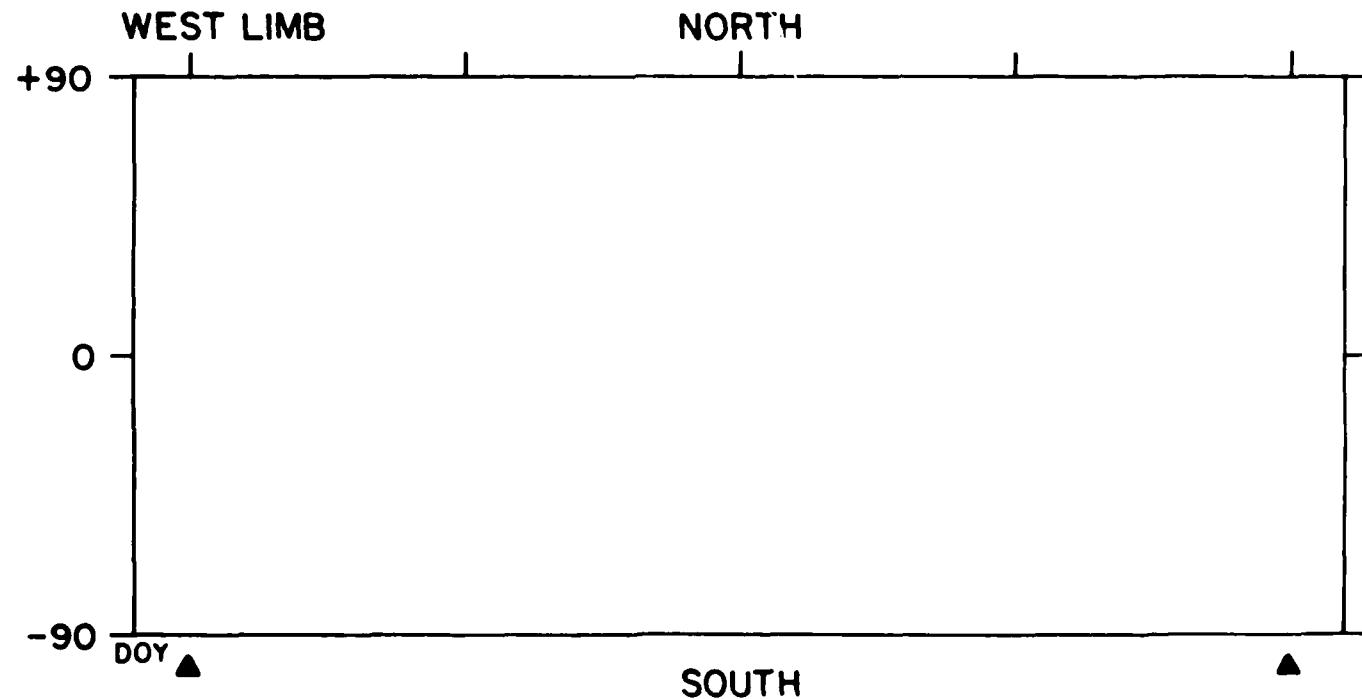
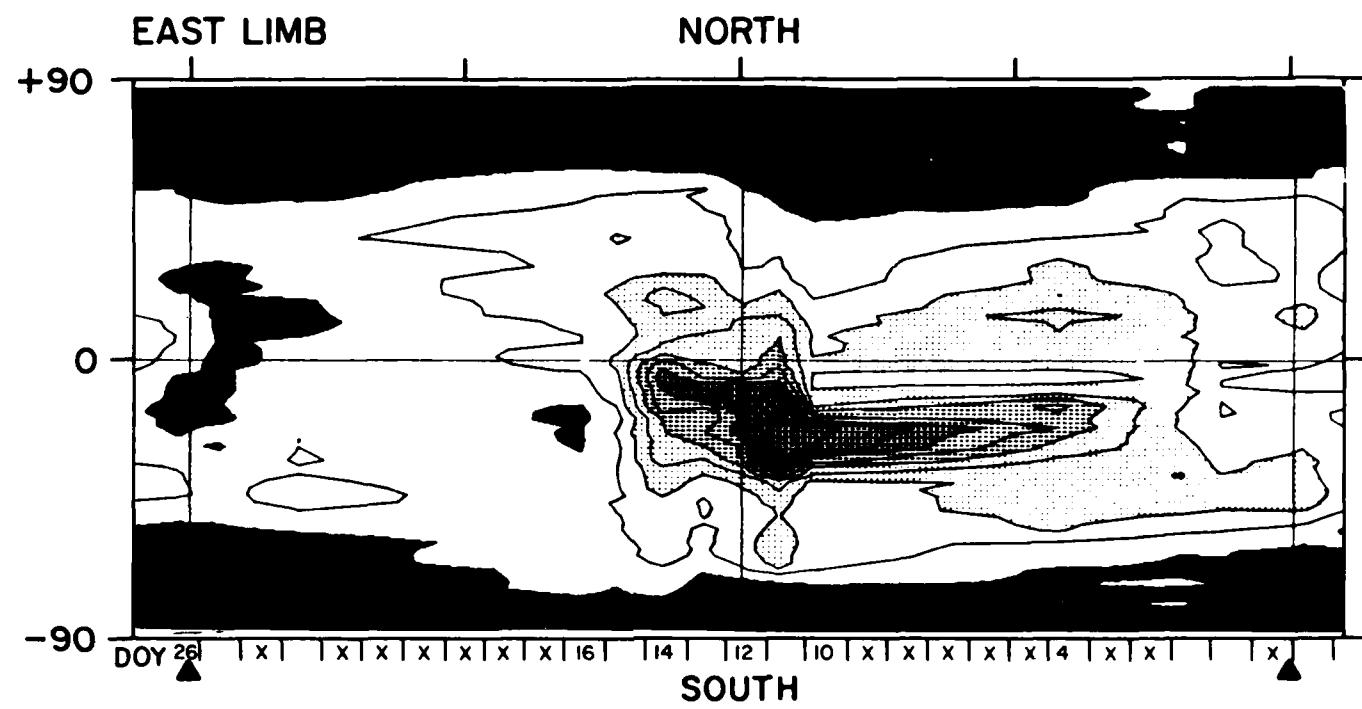
0 4 8 12 16 20 24 28 MIL  
[Scale bar markings]

X = NO DATA

**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK****Fe XIV, 5303 Å CORONAL PHOTOMETER****ROTATION 1608 HEIGHT 1.15 R<sub>o</sub> YEAR 1973****EAST LIMB****NORTH****WEST LIMB****NORTH****X = NO DATA**

**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK****Fe XIV, 5303 Å CORONAL PHOTOMETER****ROTATION 1609 HEIGHT 1.15 R<sub>⊕</sub> YEAR 1973**

X = NO DATA

**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK****Fe XIV, 5303 Å CORONAL PHOTOMETER****ROTATION 1610 HEIGHT 1.15 R<sub>o</sub> YEAR 1974**

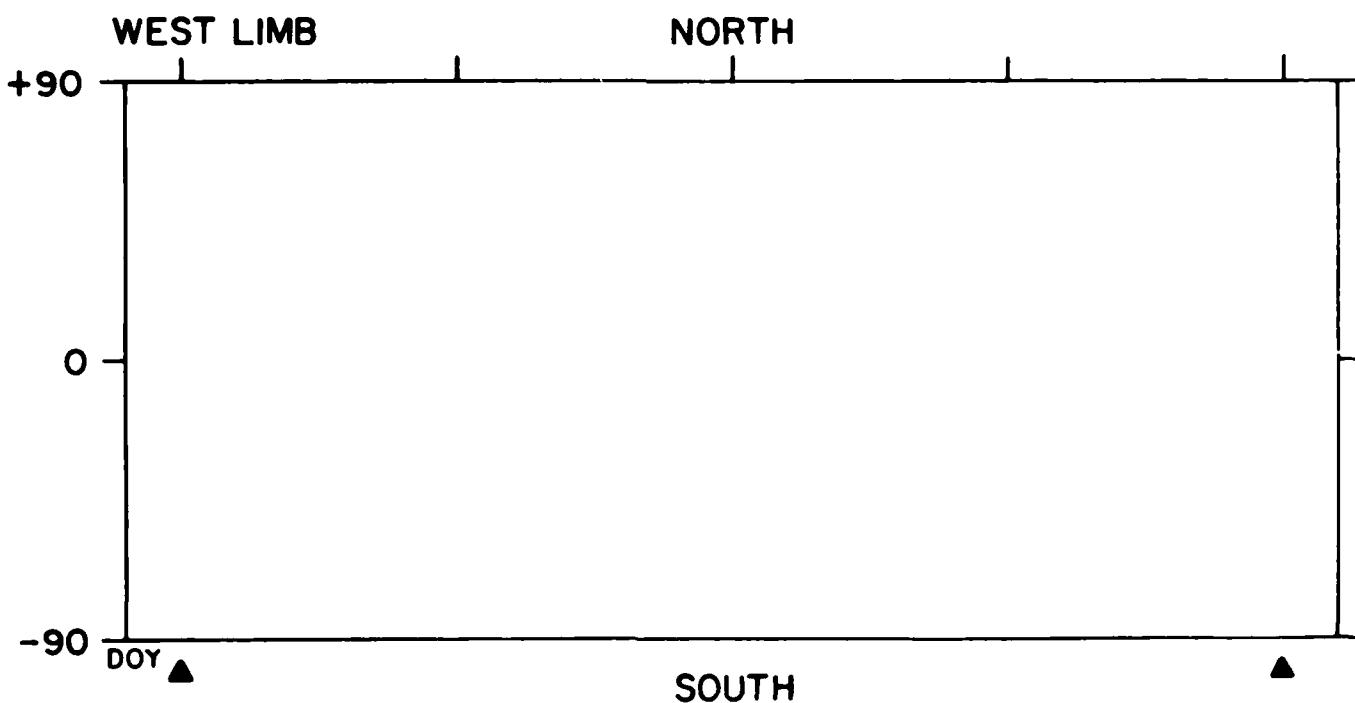
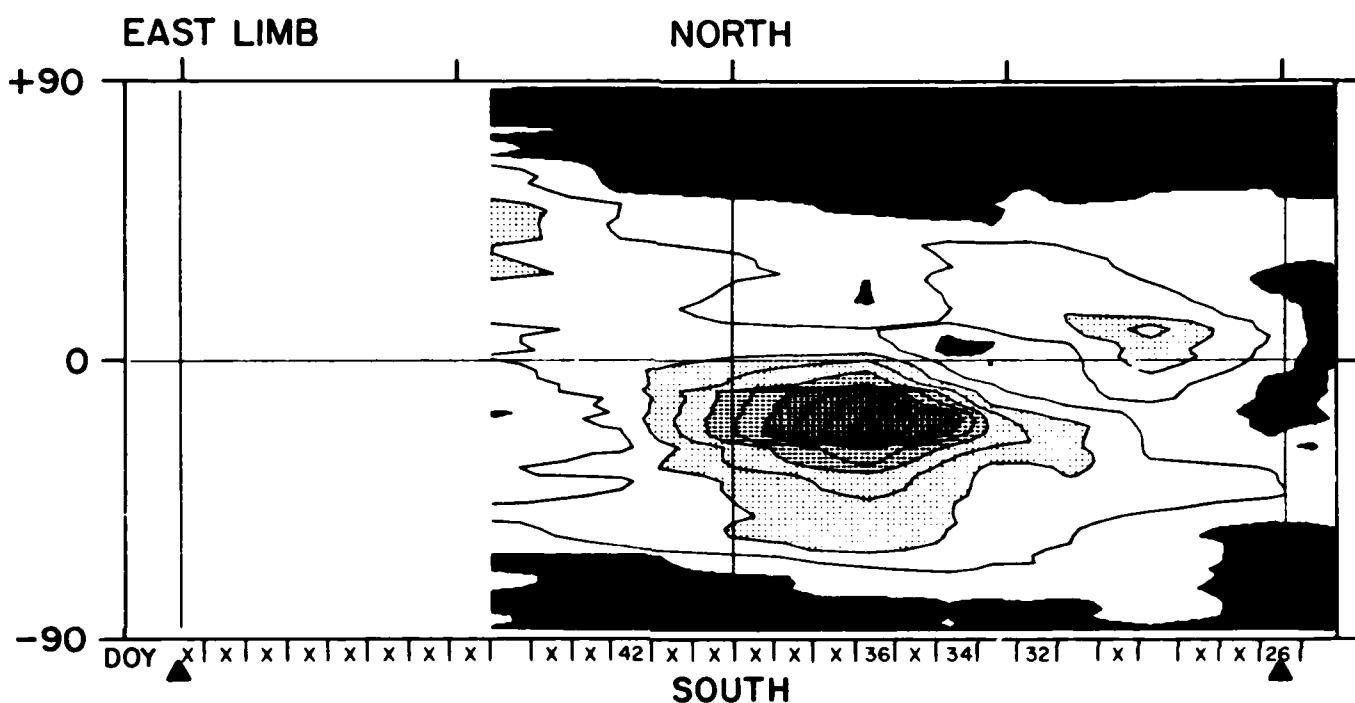
0 4 8 12 16 20 24 28 MIL  
[Scale bar with markings]

X = NO DATA

**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK**

**Fe XIV, 5303 Å CORONAL PHOTOMETER**

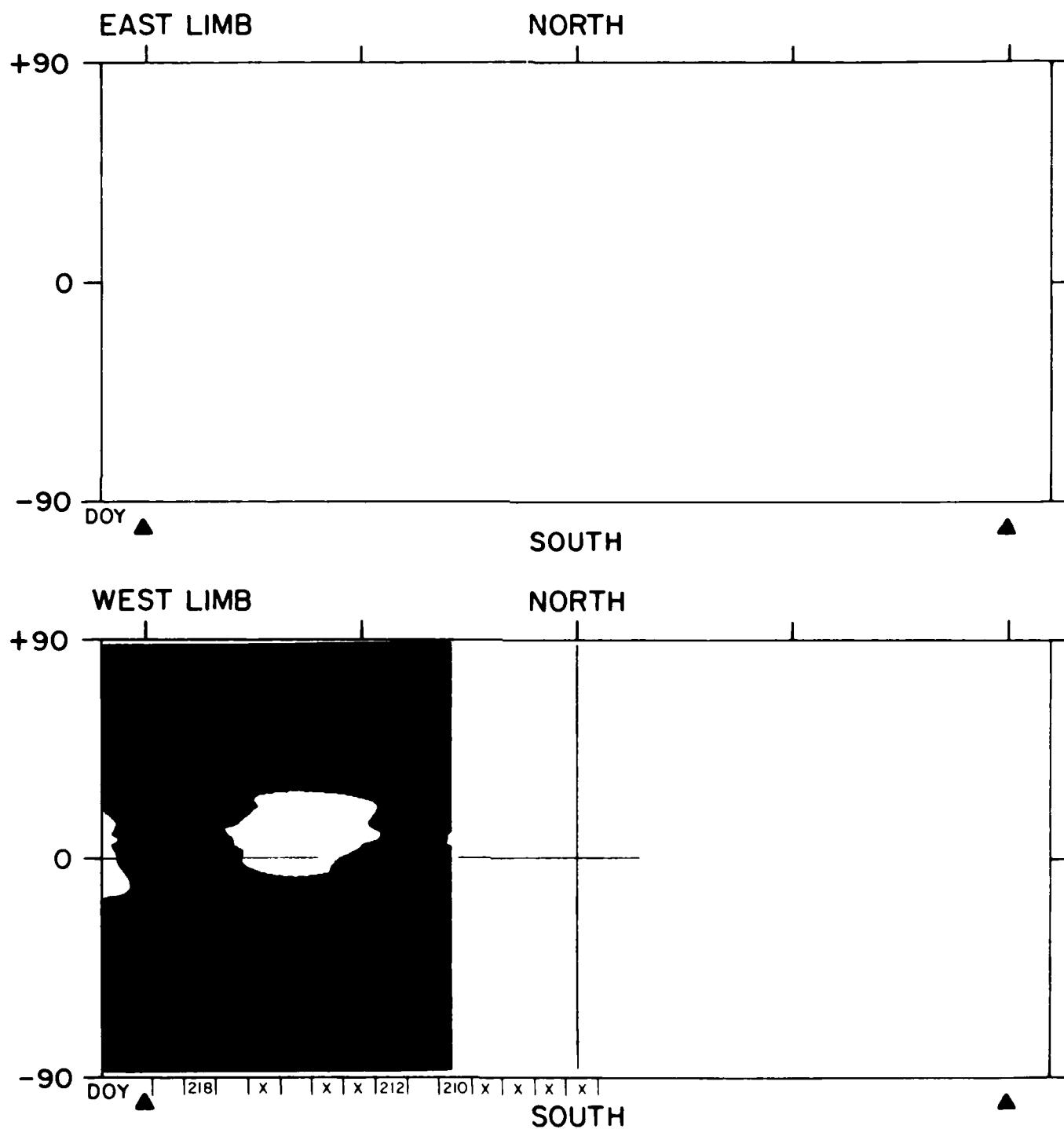
**ROTATION 16II      HEIGHT 1.15 R<sub>⊕</sub>      YEAR 1974**

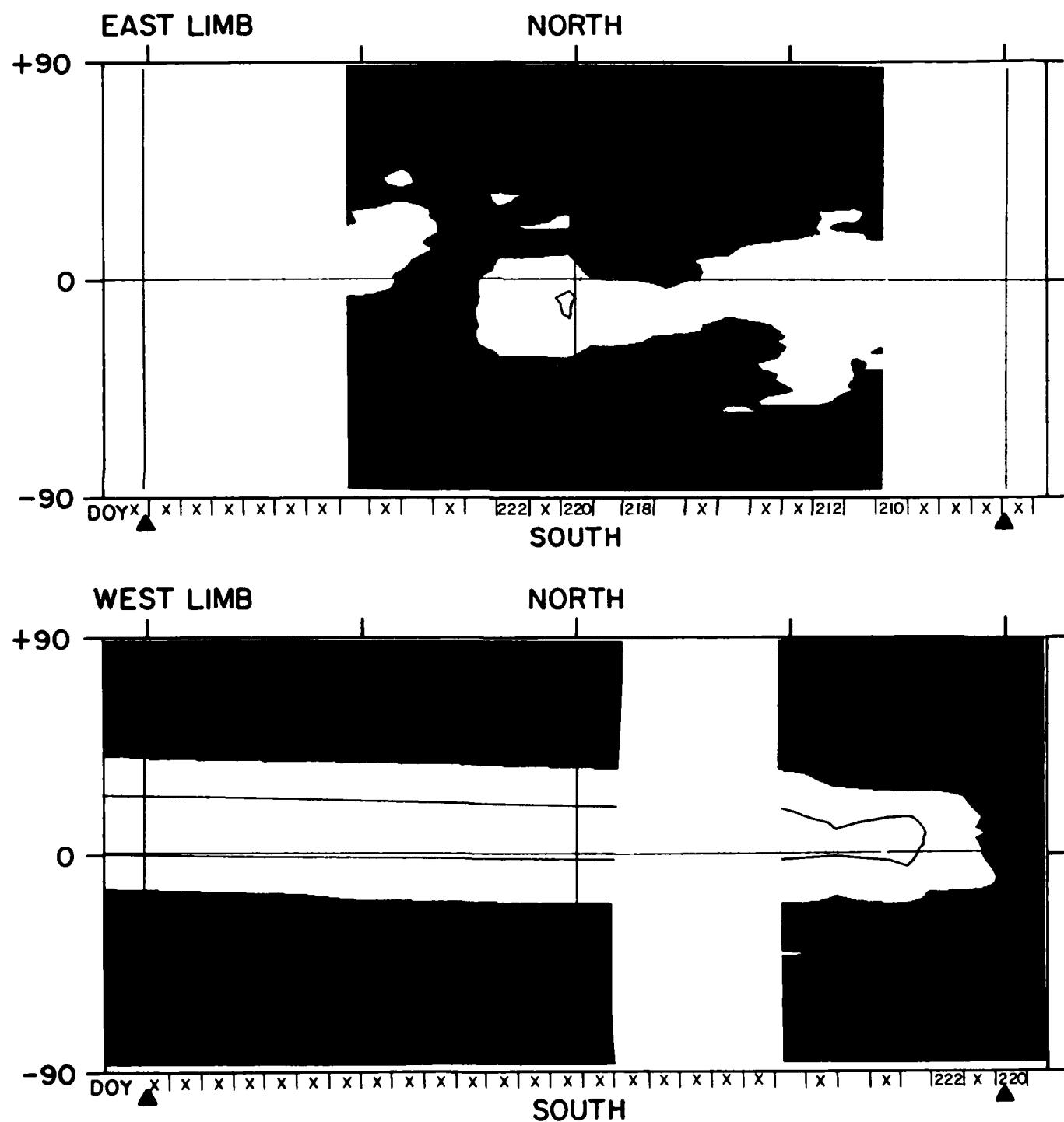


0 4 8 12 16 20 24 28 MIL

X = NO DATA

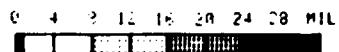
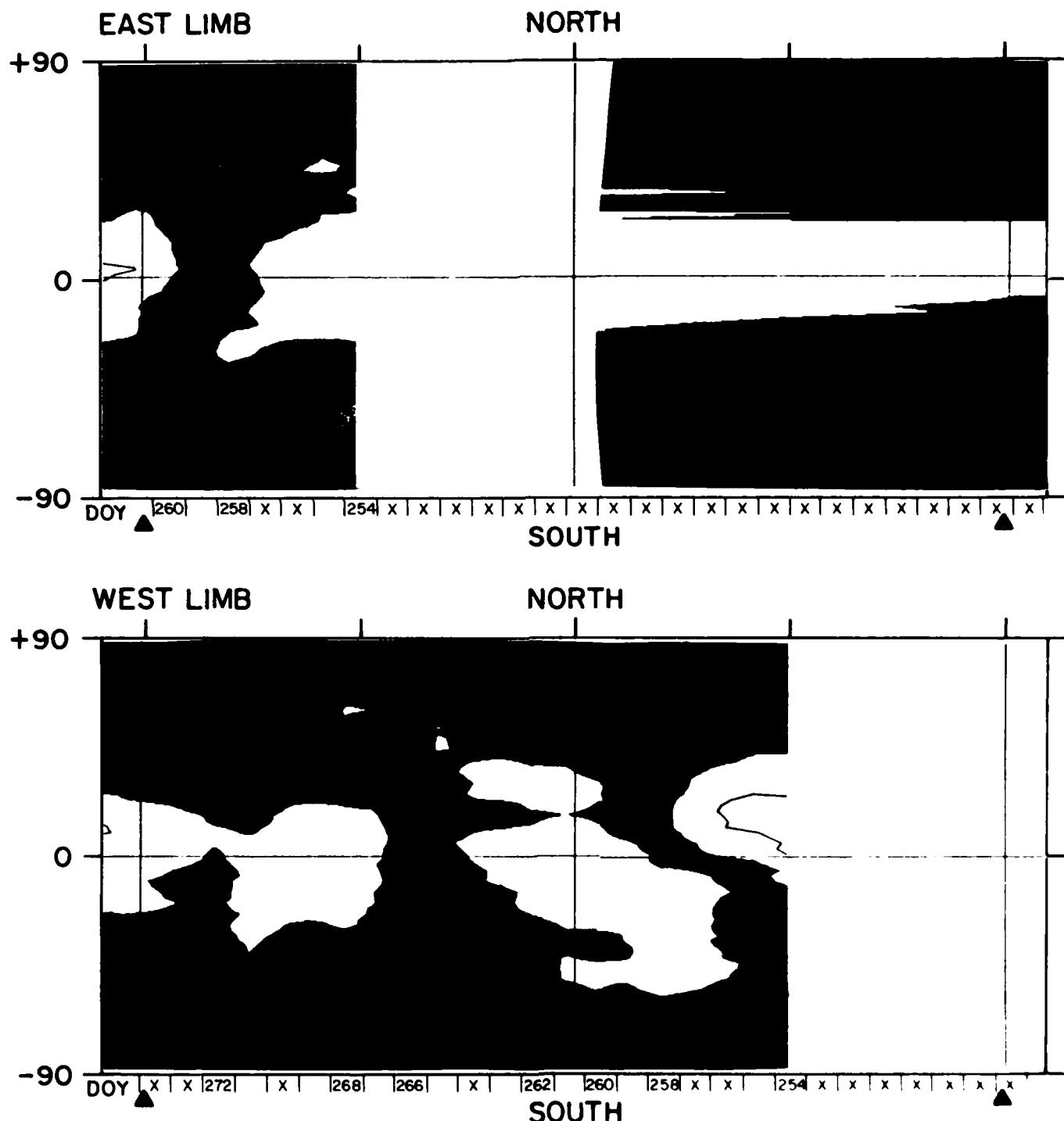
No data for Carrington rotations 1612-1629

**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK****Fe XIV, 5303 Å CORONAL PHOTOMETER****ROTATION 1630 HEIGHT 1.15 R<sub>⊕</sub> YEAR 1975****X = NO DATA**

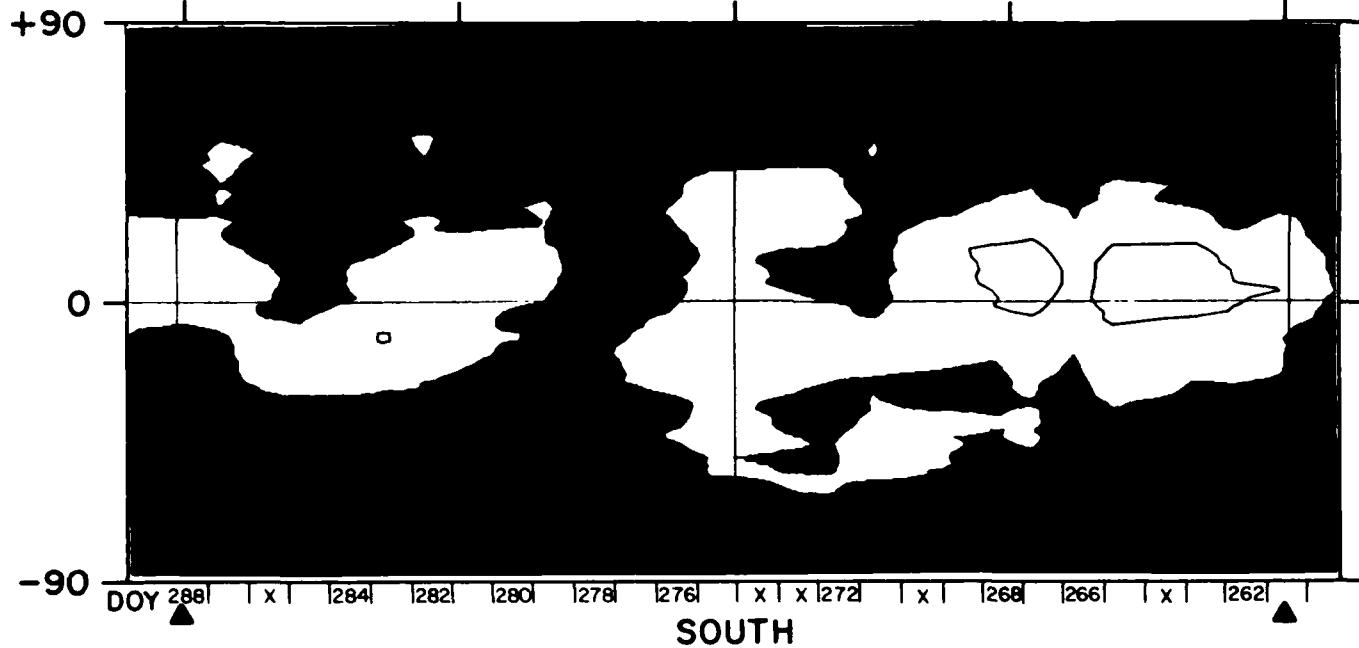
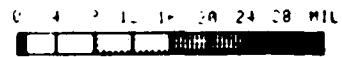
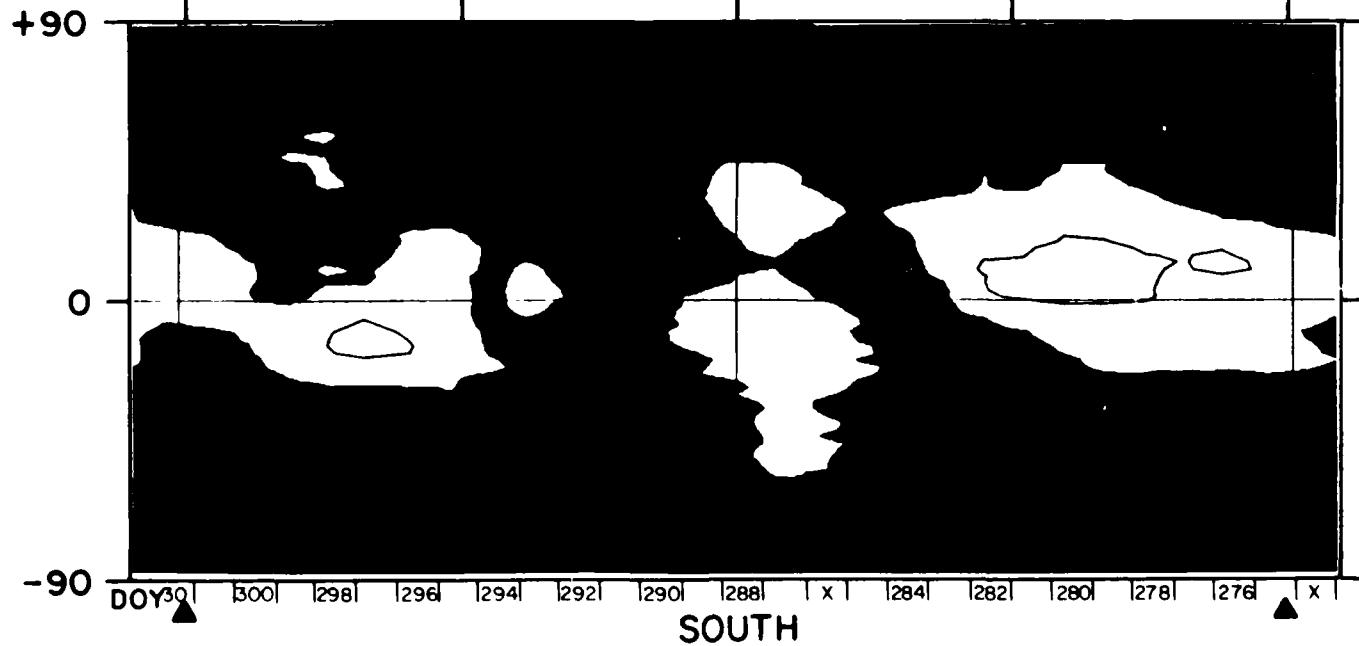
**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK****Fe XIV, 5303 Å CORONAL PHOTOMETER****ROTATION 1631    HEIGHT 1.15 R<sub>⊕</sub>    YEAR 1975**

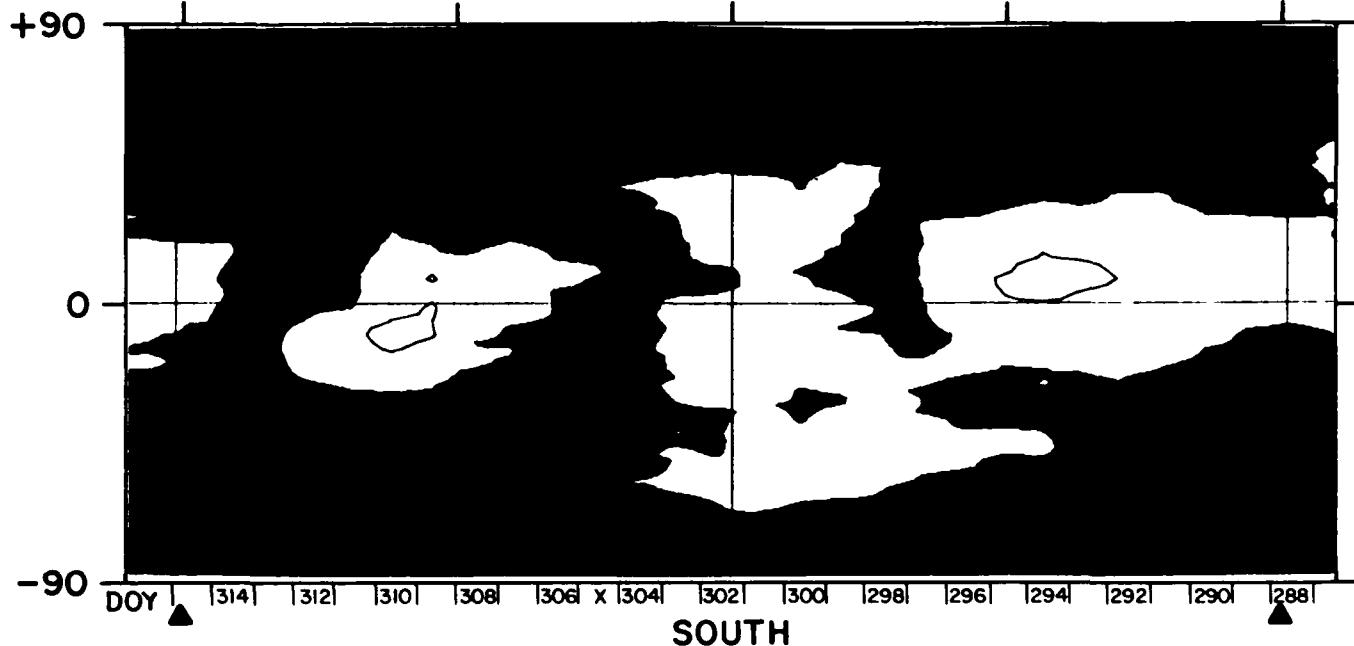
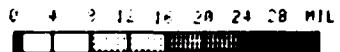
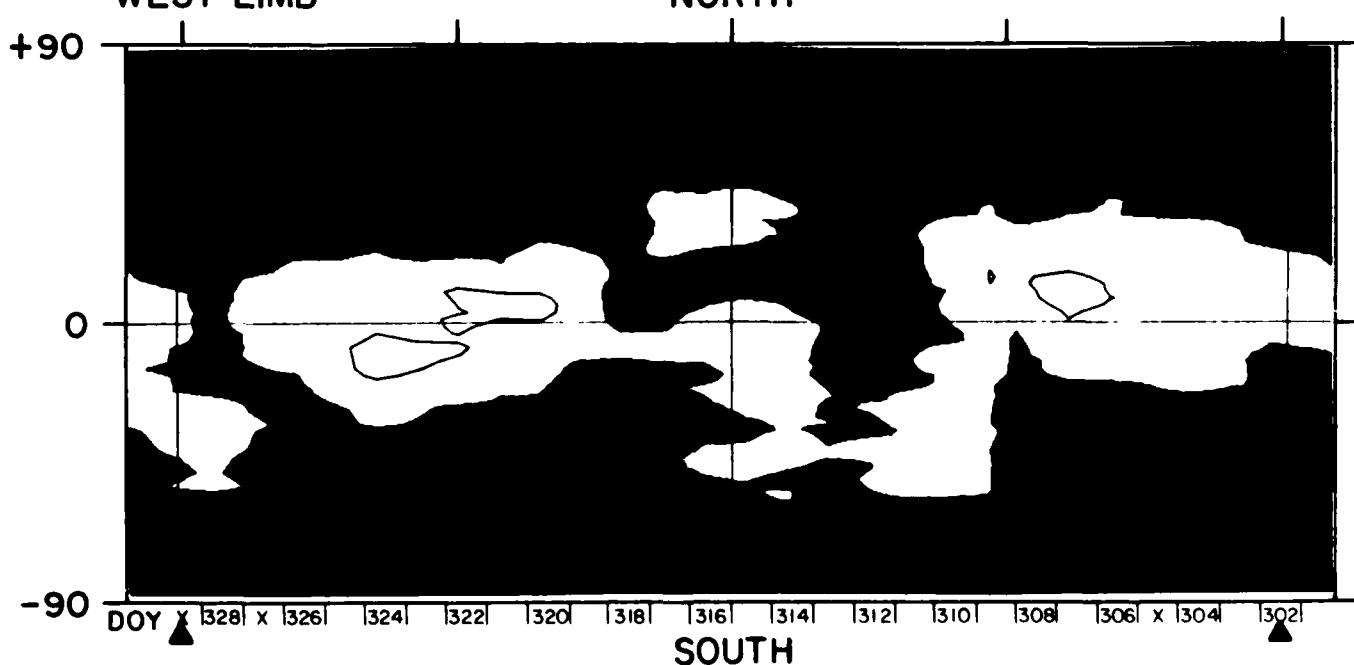
0 4 8 12 16 20 24 28 MIL  
[A grayscale bar with a scale from 0 to 28 MIL]

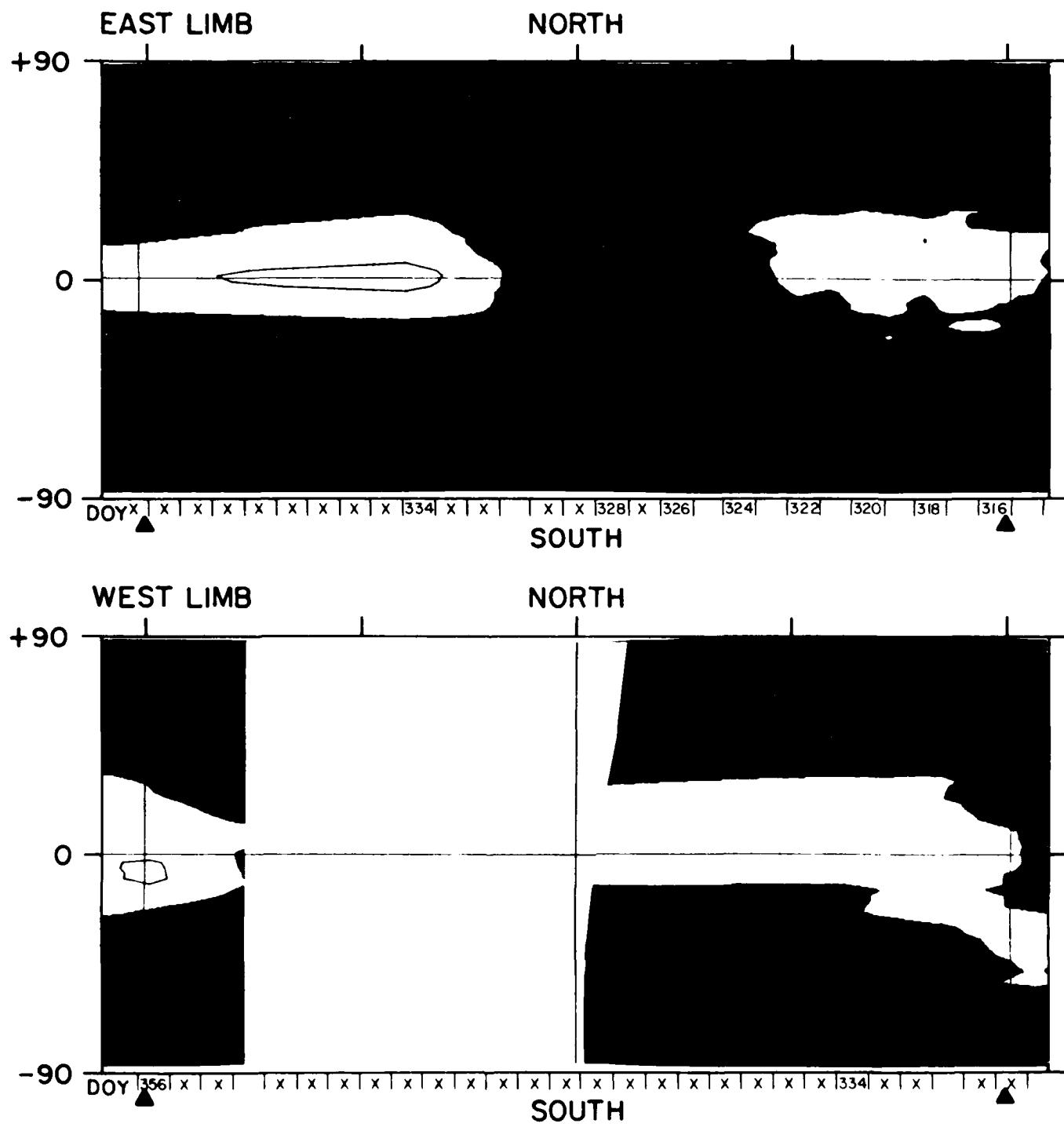
X = NO DATA

**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK****Fe XIV, 5303 Å CORONAL PHOTOMETER****ROTATION 1632 HEIGHT 1.15R<sub>sun</sub> YEAR 1975**

X = NO DATA

**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK****Fe XIV, 5303 Å CORONAL PHOTOMETER****ROTATION 1633 HEIGHT 1.15 R<sub>⊕</sub> YEAR 1975****EAST LIMB****NORTH****WEST LIMB****NORTH****X = NO DATA**

**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK****Fe XIV, 5303 Å CORONAL PHOTOMETER****ROTATION 1634 HEIGHT 1.15R<sub>o</sub> YEAR 1975****EAST LIMB****NORTH****WEST LIMB****NORTH****X = NO DATA**

**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK****Fe XIV, 5303 Å CORONAL PHOTOMETER****ROTATION 1635 HEIGHT 1.15 R<sub>⊕</sub> YEAR 1975**

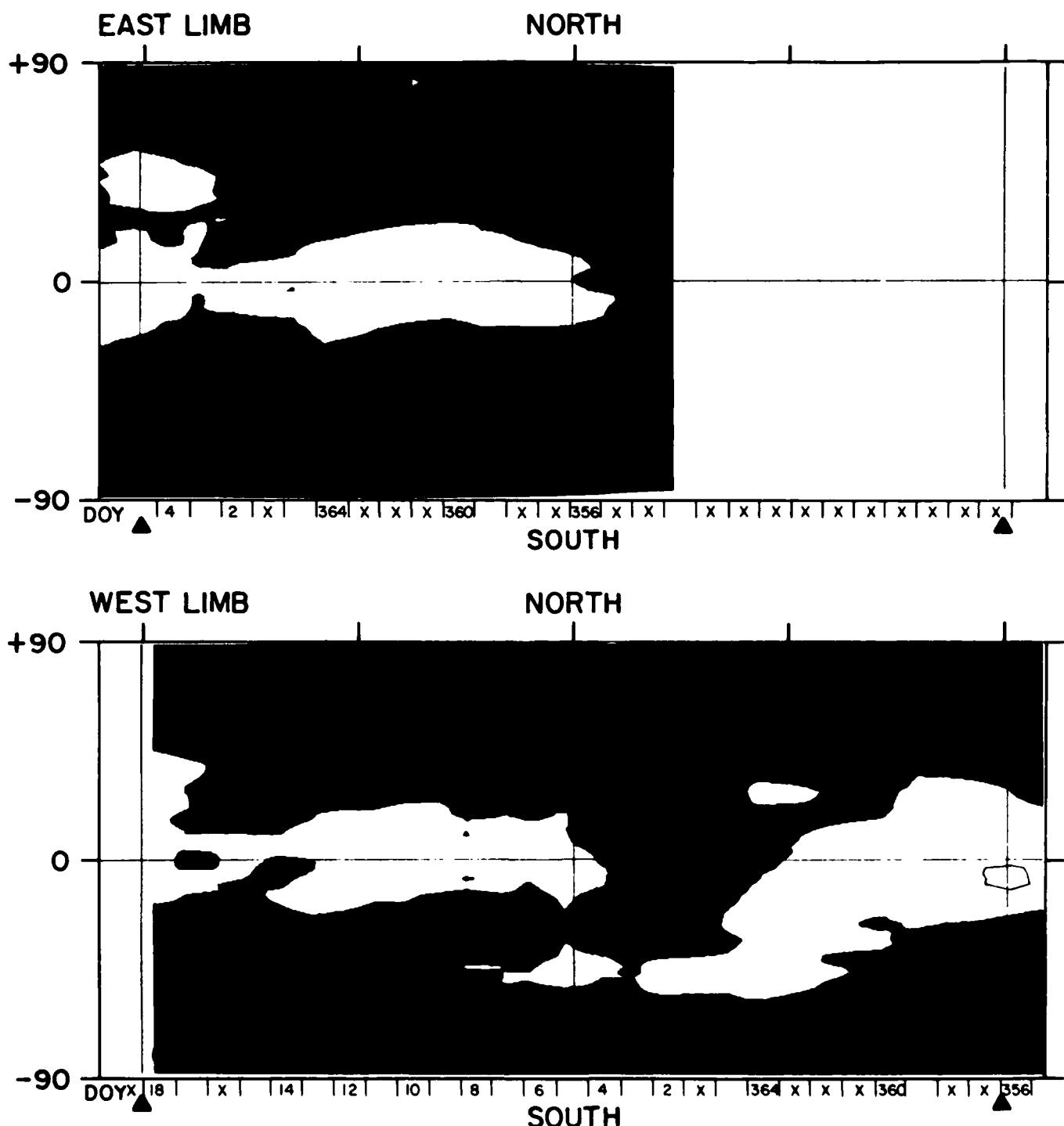
0 4 2 1 1+ 20 24 28 MIL  
[Scale bar markings]

X = NO DATA

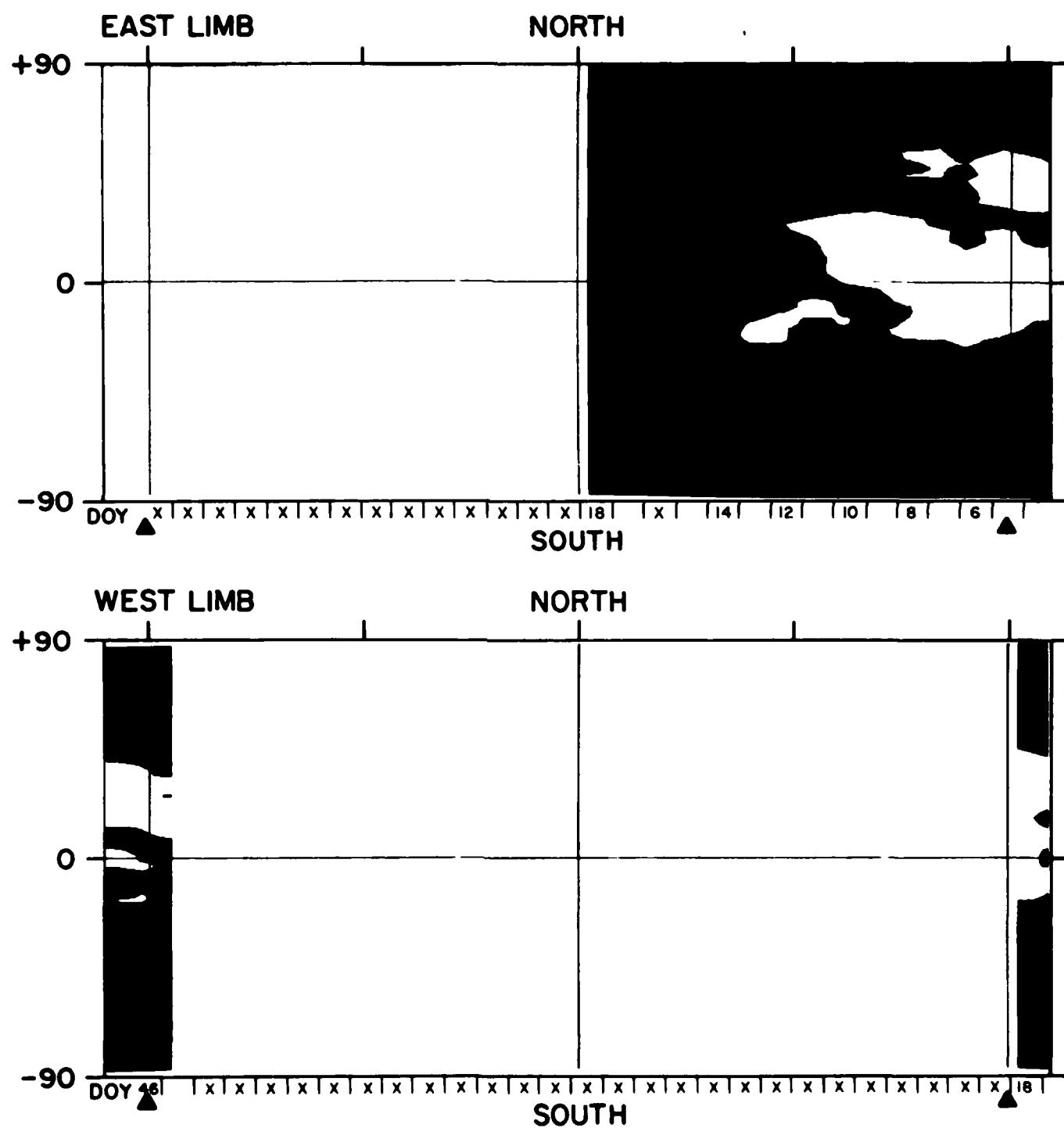
NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1636 HEIGHT 1.15 R<sub>•</sub> YEAR 1975

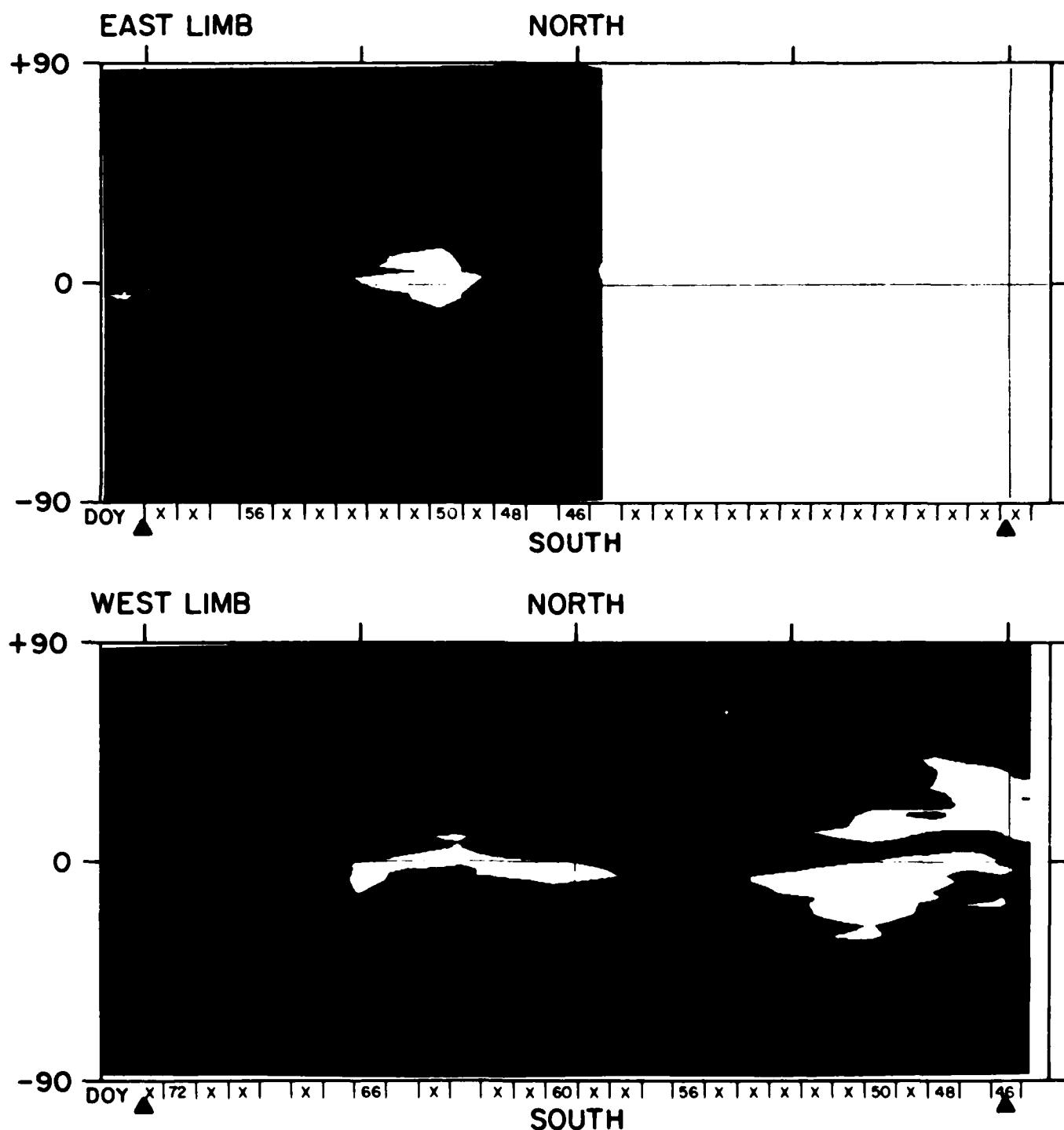


X = NO DATA

**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK****Fe XIV, 5303 Å CORONAL PHOTOMETER****ROTATION 1637 HEIGHT 1.15 R<sub>•</sub> YEAR 1976**

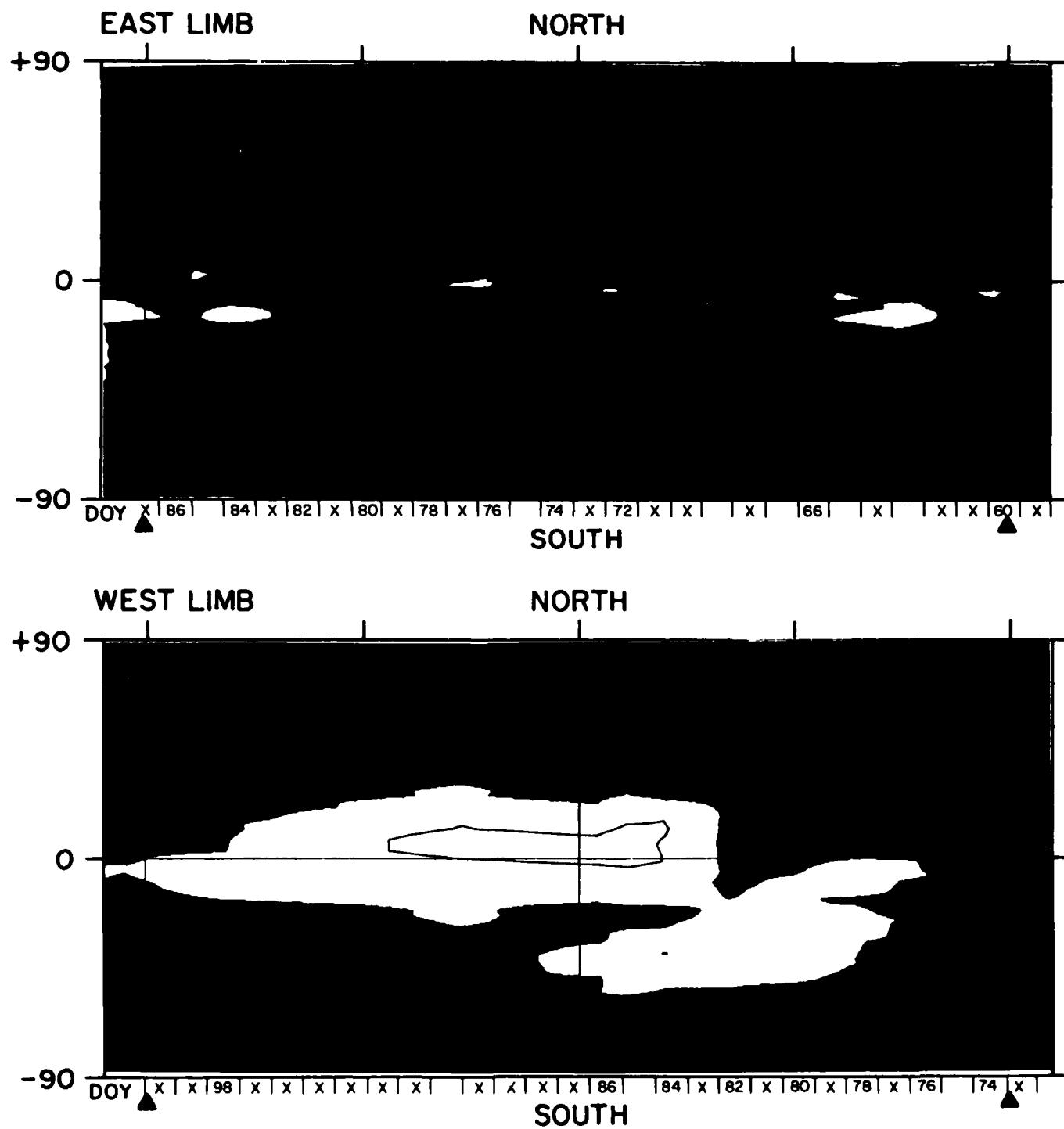
0 4 8 12 16 20 24 28 MIL  
[A grayscale bar with tick marks at 0, 4, 8, 12, 16, 20, 24, and 28 miles.]

X = NO DATA

**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK****Fe XIV, 5303 Å CORONAL PHOTOMETER****ROTATION 1638 HEIGHT 1.15R<sub>o</sub> YEAR 1976**

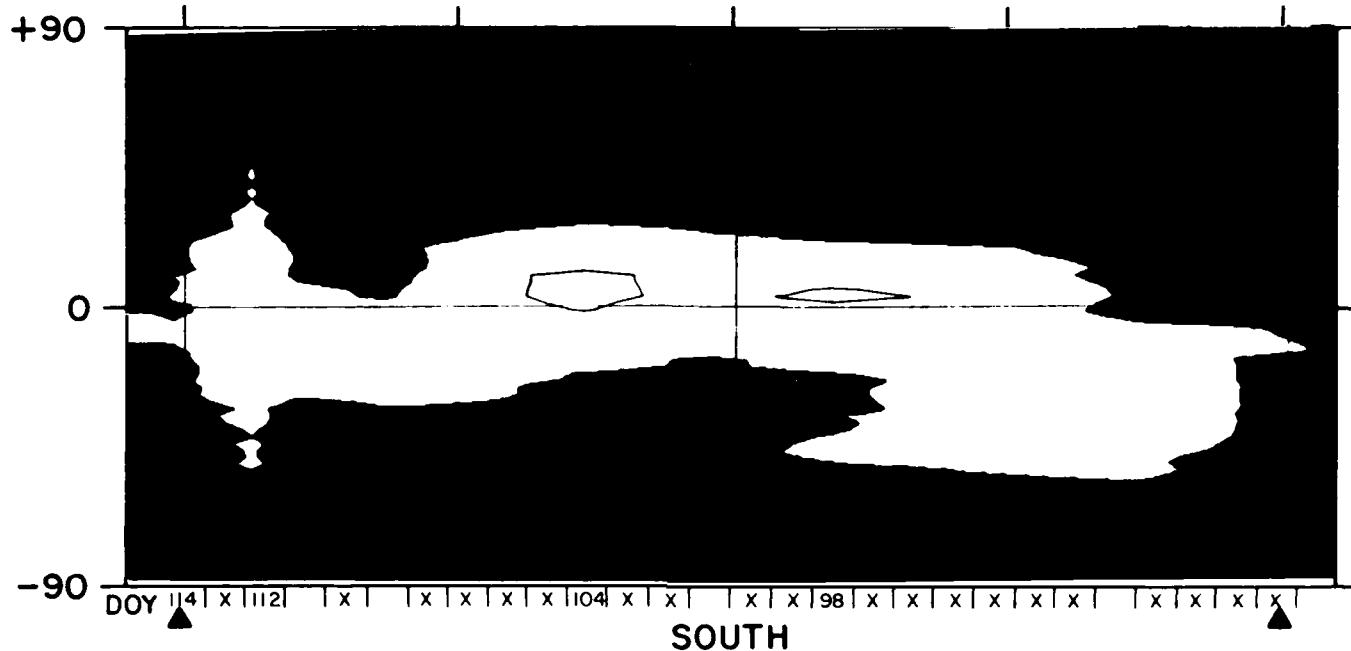
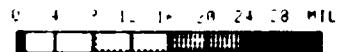
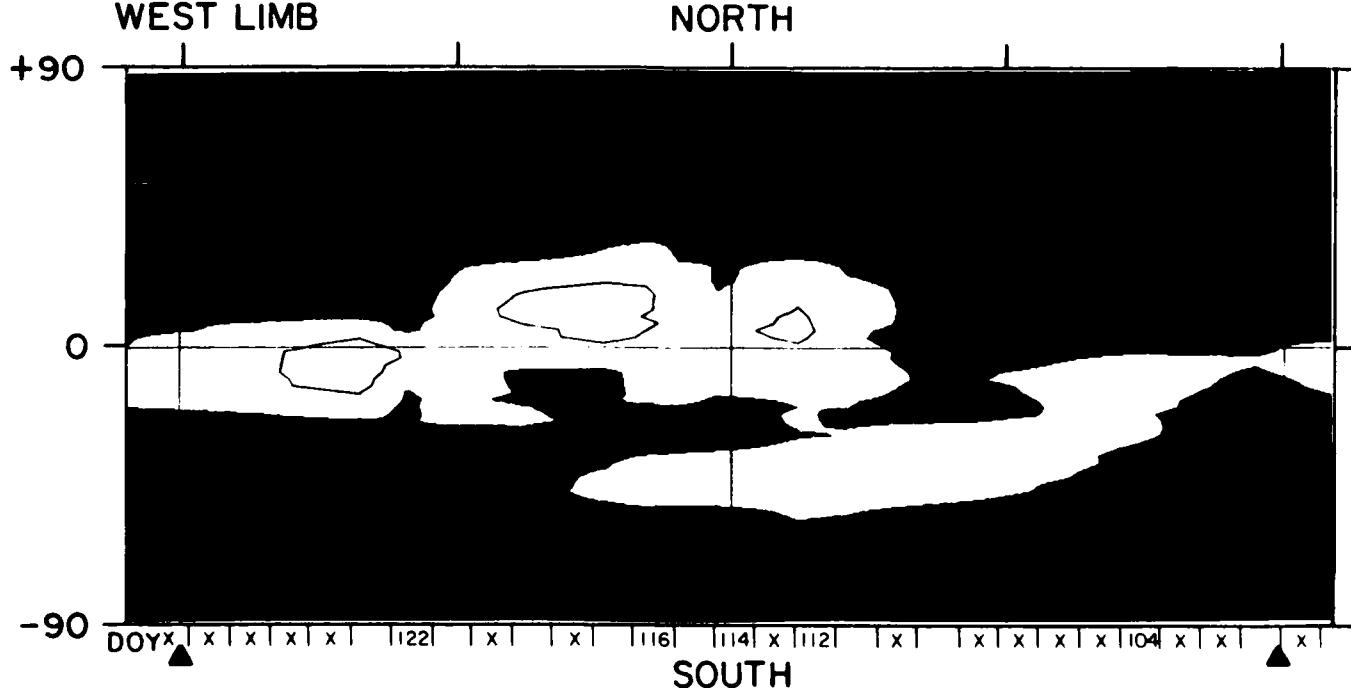
0 4 8 12 16 20 24 28 MIL  
Scale bar: 1 mil = 100 km

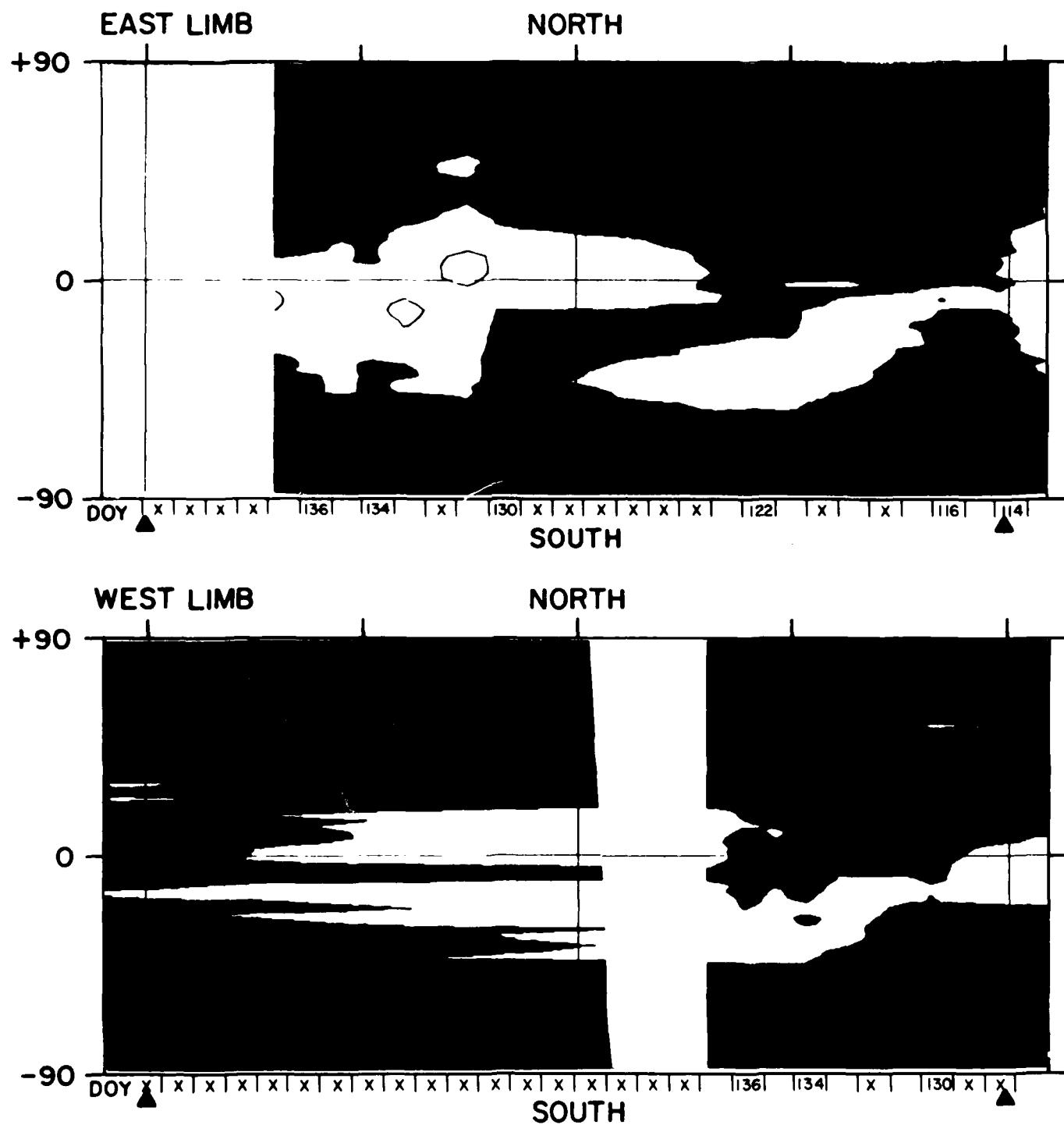
X = NO DATA

**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK****Fe XIV, 5303 Å CORONAL PHOTOMETER****ROTATION 1639    HEIGHT 1.15 R<sub>⊕</sub>    YEAR 1976**

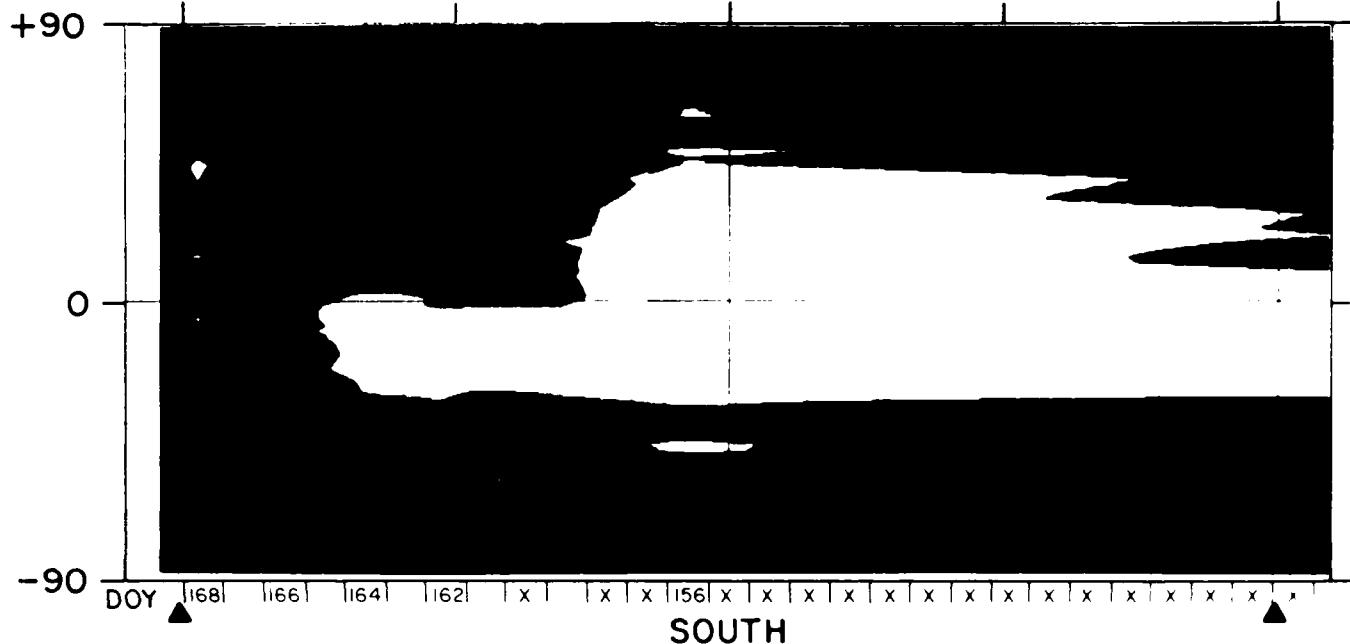
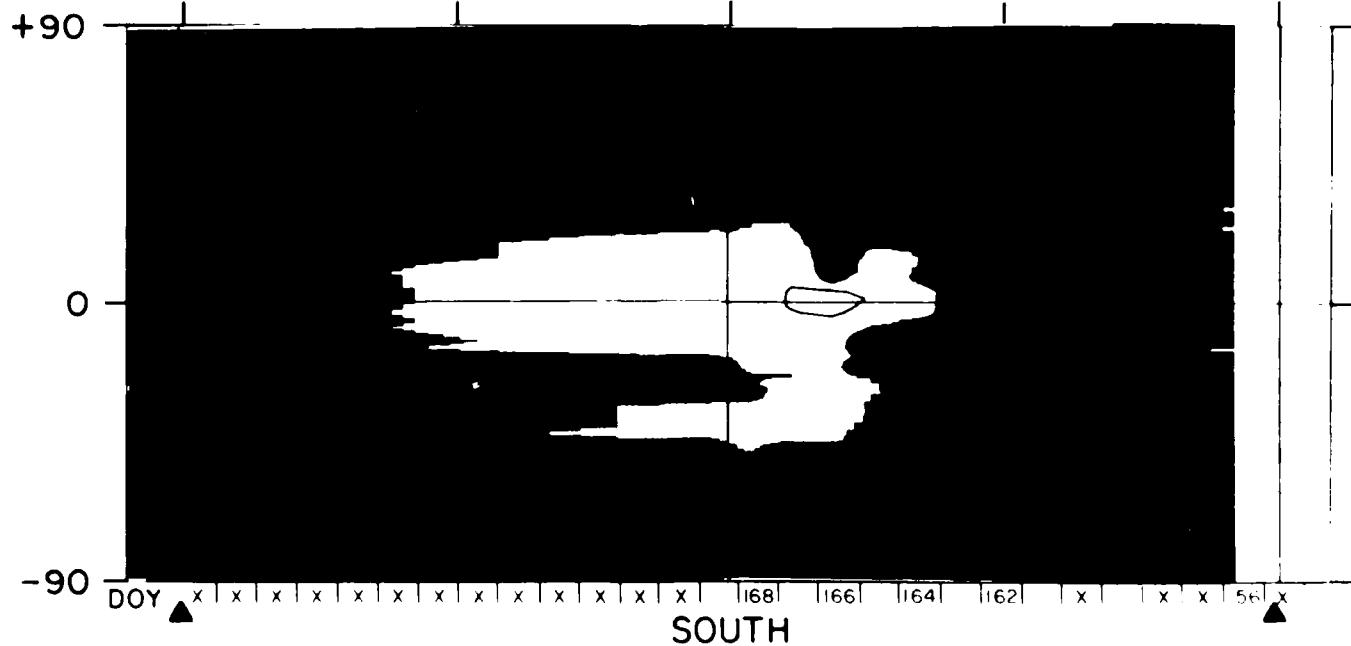
0 4 8 12 16 20 24 28 MIL  
[A grayscale bar with tick marks at 0, 4, 8, 12, 16, 20, 24, 28]

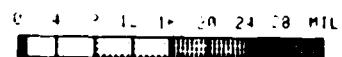
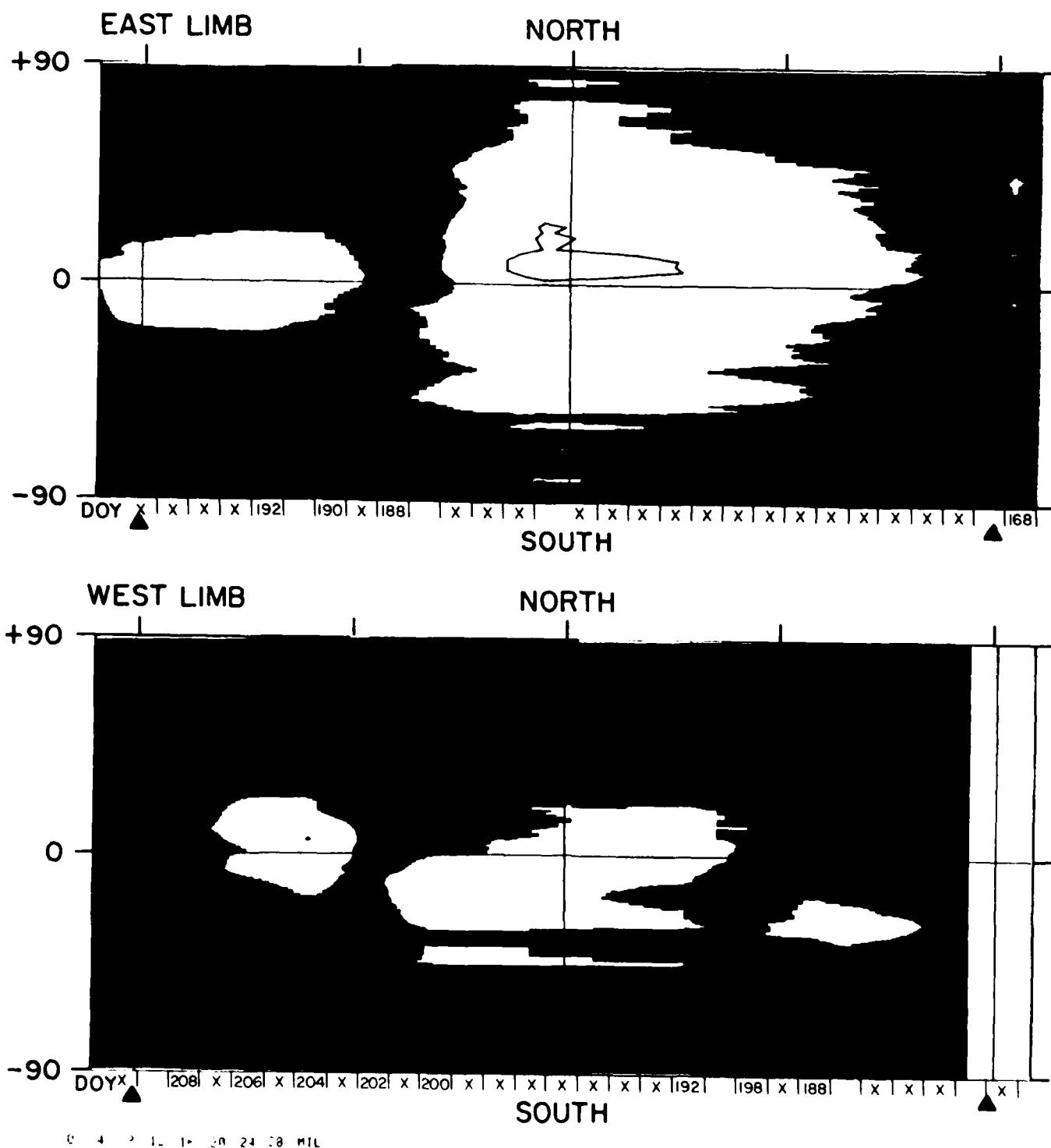
X = NO DATA

**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK****Fe XIV, 5303 Å CORONAL PHOTOMETER****ROTATION 1640 HEIGHT 1.15 R<sub>o</sub> YEAR 1976****EAST LIMB****NORTH****WEST LIMB****NORTH****X = NO DATA**

**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK****Fe XIV, 5303 Å CORONAL PHOTOMETER****ROTATION 1641    HEIGHT 1.15 R<sub>⊕</sub>    YEAR 1976**0 4 8 12 16 20 24 28 MIL  

X = NO DATA

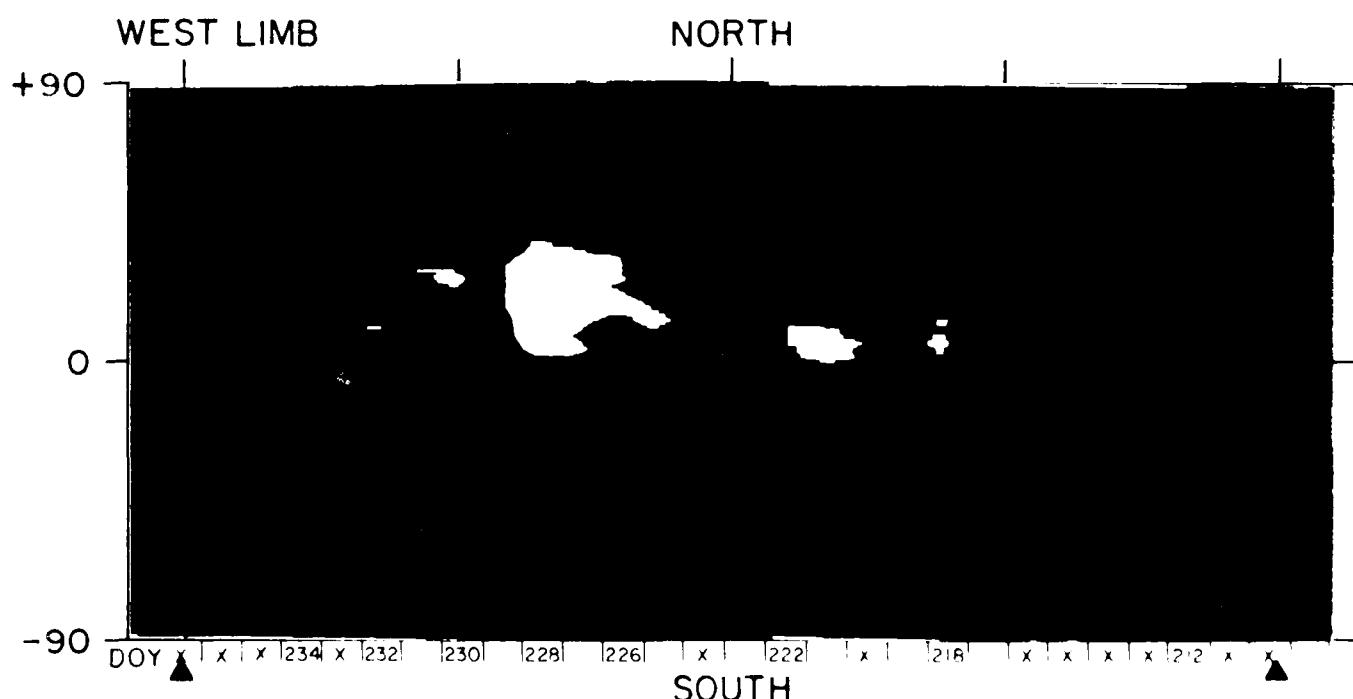
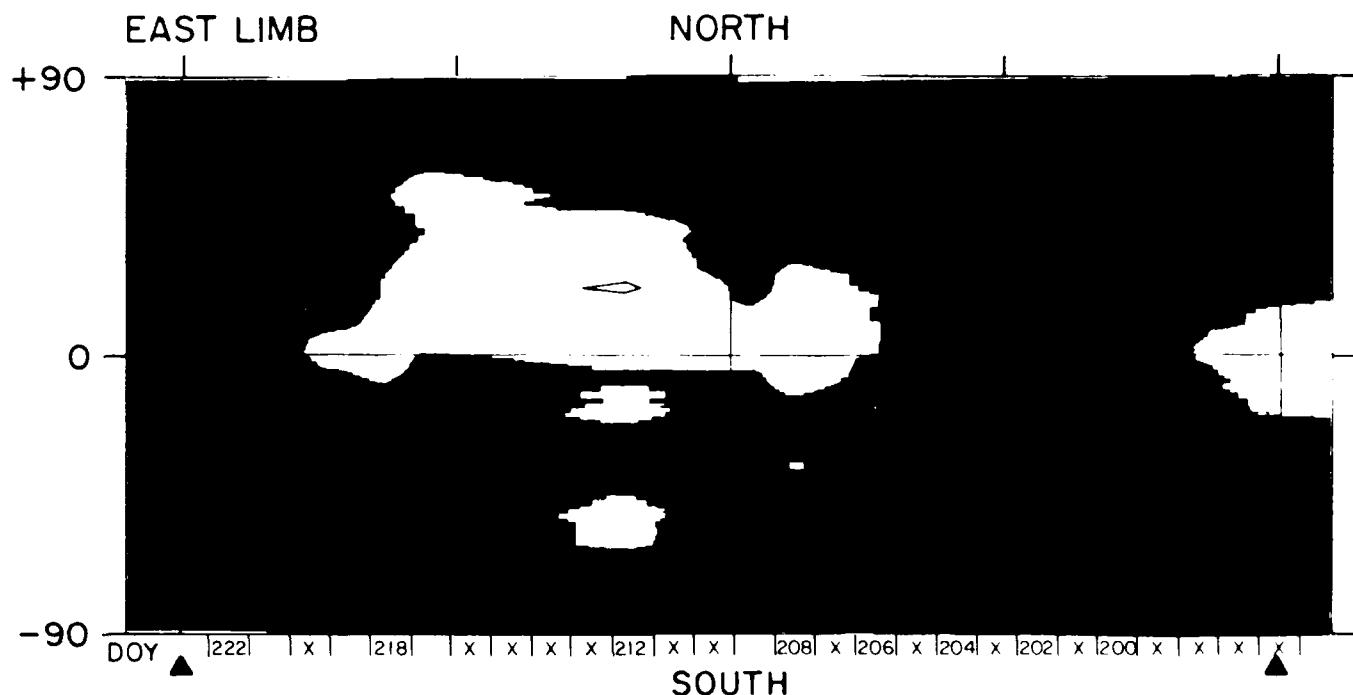
**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK****Fe XIV, 5303 Å CORONAL PHOTOMETER****ROTATION 1642    HEIGHT 1.15 R<sub>○</sub>    YEAR 1976****EAST LIMB****NORTH****WEST LIMB****NORTH****X = NO DATA**

**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK****Fe XIV, 5303 Å CORONAL PHOTOMETER****ROTATION 1643 HEIGHT 1.15 R<sub>⊕</sub> YEAR 1976**

X = NO DATA

**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK**

Fe XIV, 5303 Å CORONAL PHOTOMETER

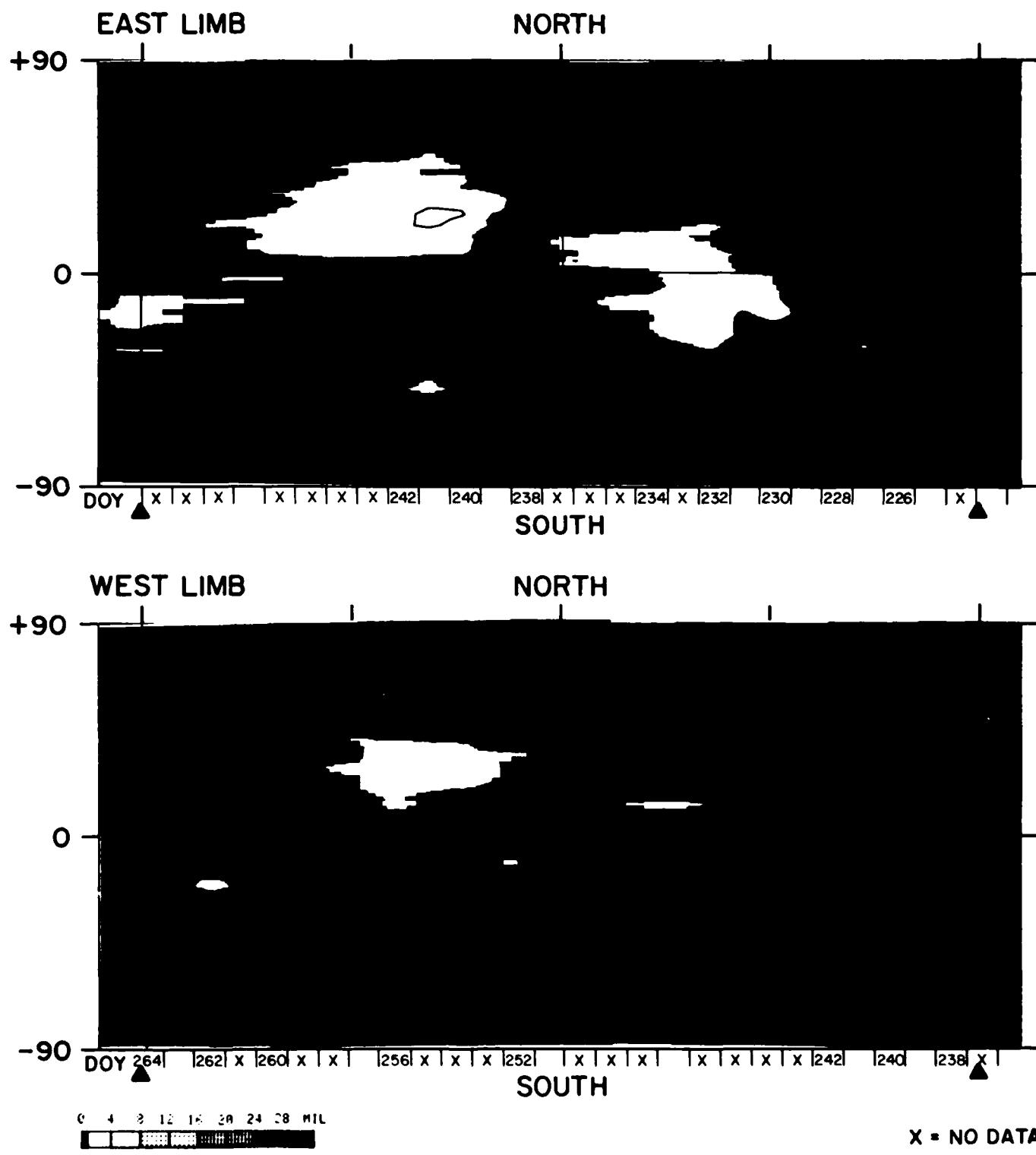
ROTATION 1644 HEIGHT 1.15R<sub>o</sub> YEAR 1976

X = NO DATA

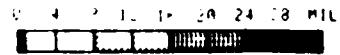
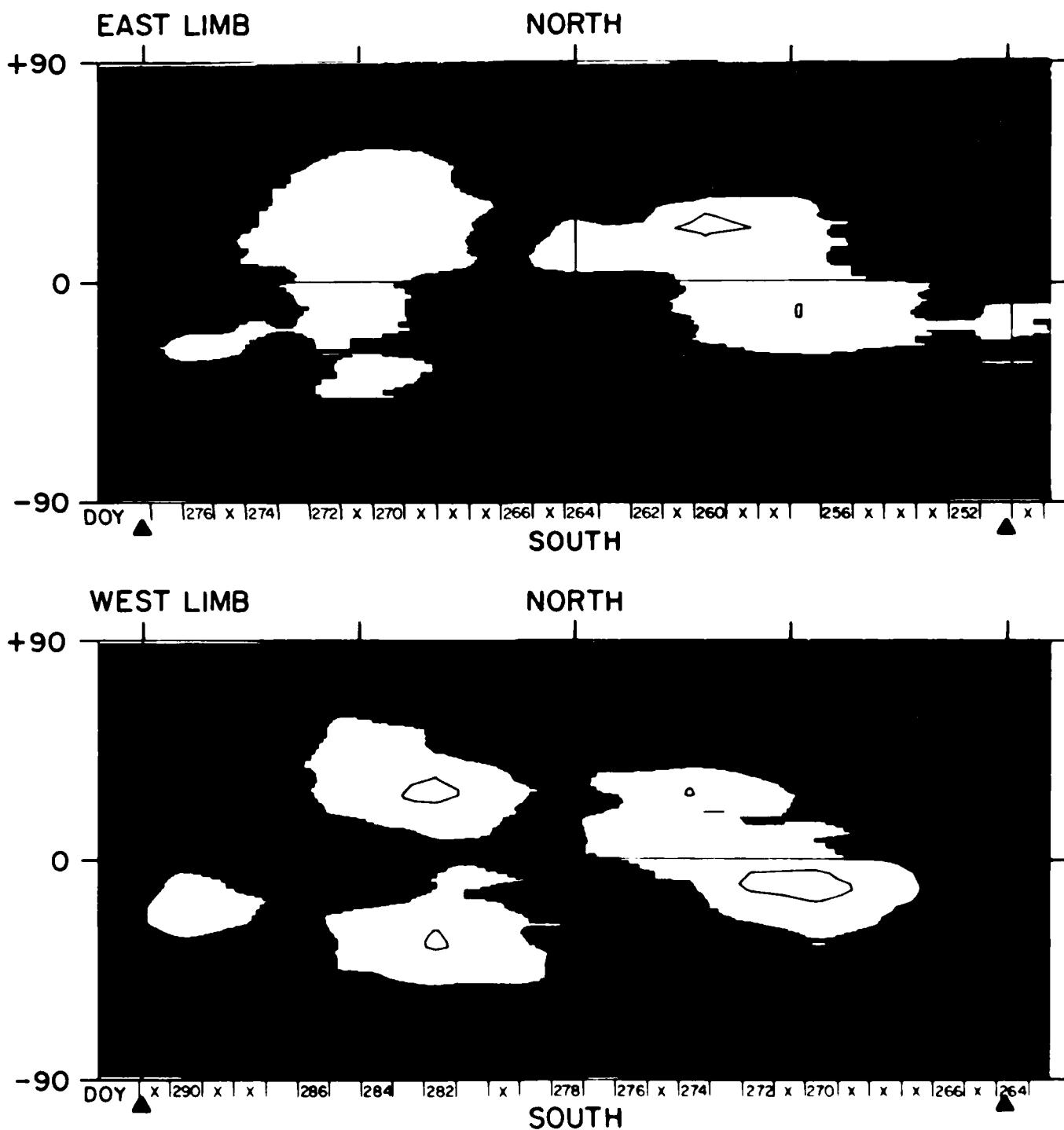
**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK**

Fe XIV, 5303 Å CORONAL PHOTOMETER

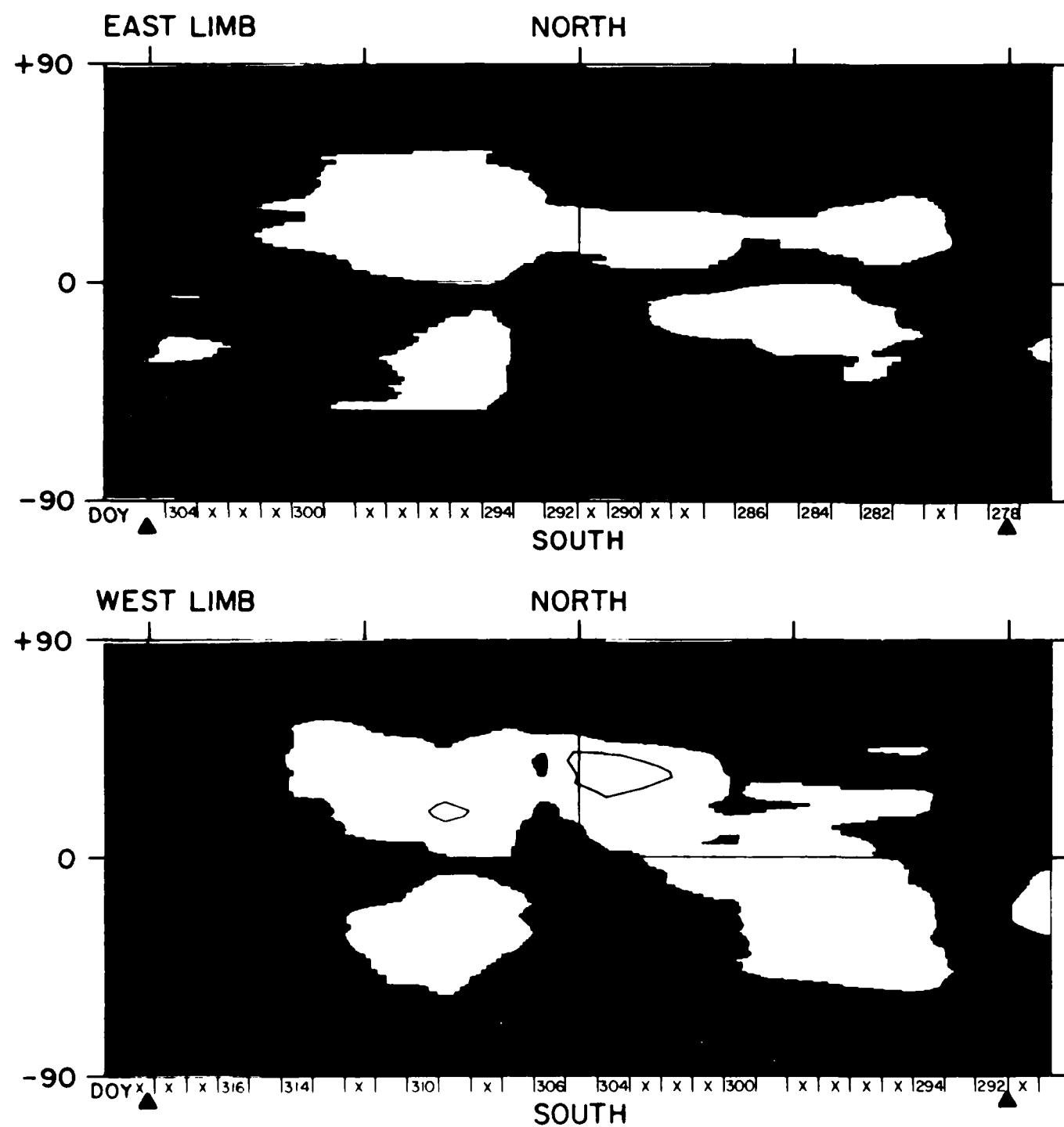
ROTATION 1645 HEIGHT 1.15 R<sub>⊕</sub> YEAR 1976



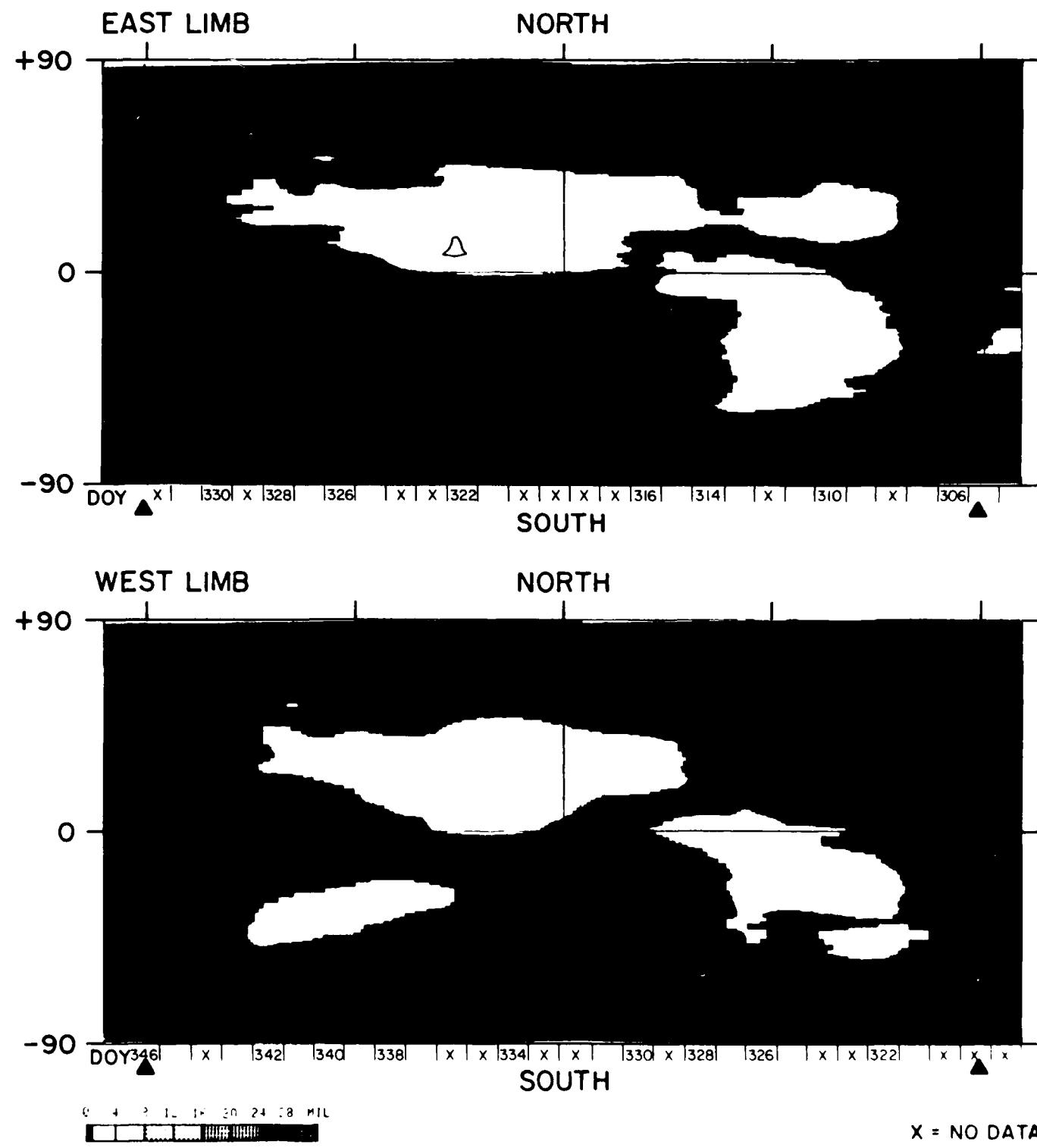
X = NO DATA

**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK****Fe XIV, 5303 Å CORONAL PHOTOMETER****ROTATION 1646 HEIGHT 1.15 R<sub>o</sub> YEAR 1976**

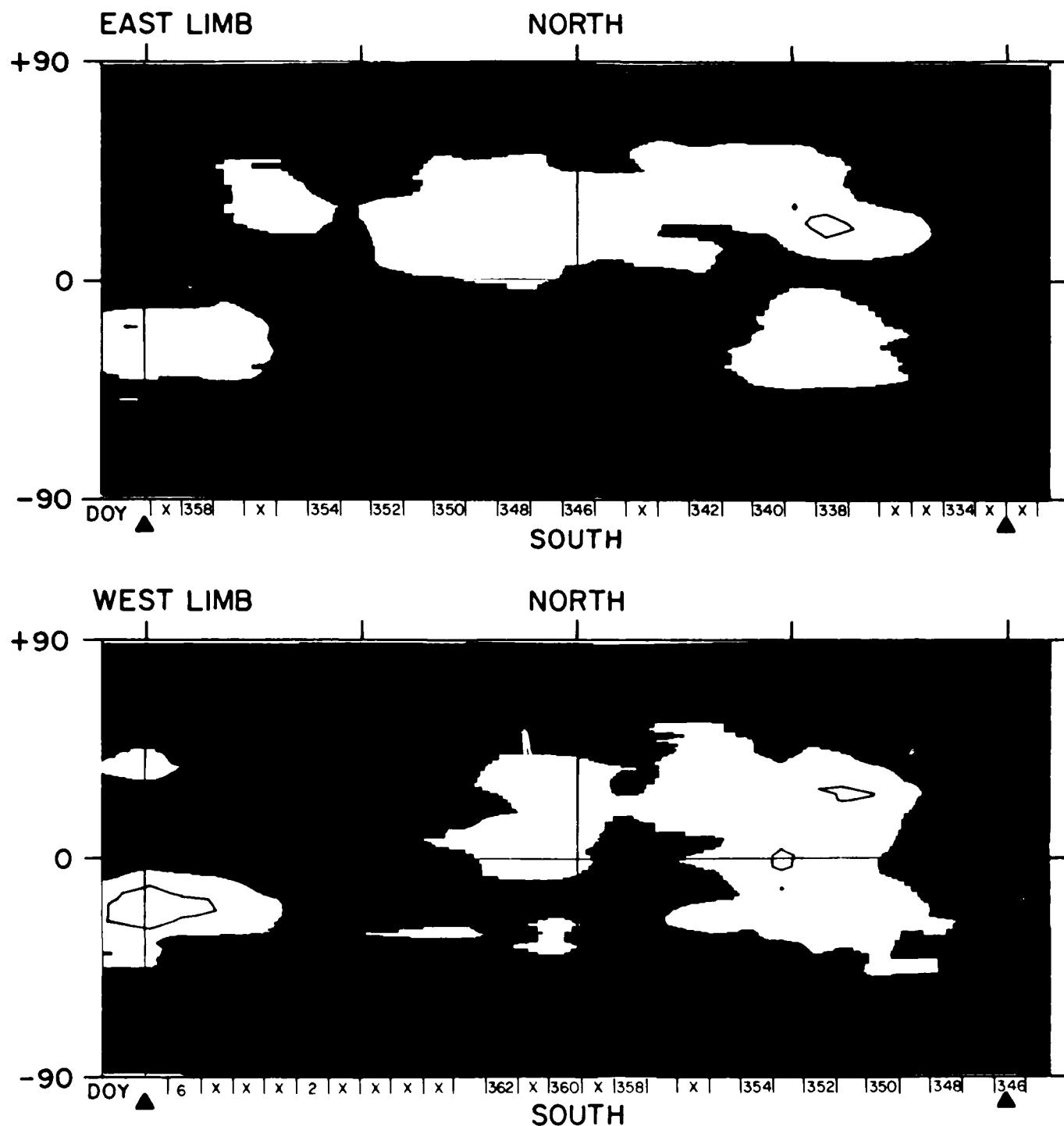
X = NO DATA

**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK****Fe XIV, 5303 Å CORONAL PHOTOMETER****ROTATION 1647 HEIGHT 1.15 R<sub>⊕</sub> YEAR 1976**

X = NO DATA

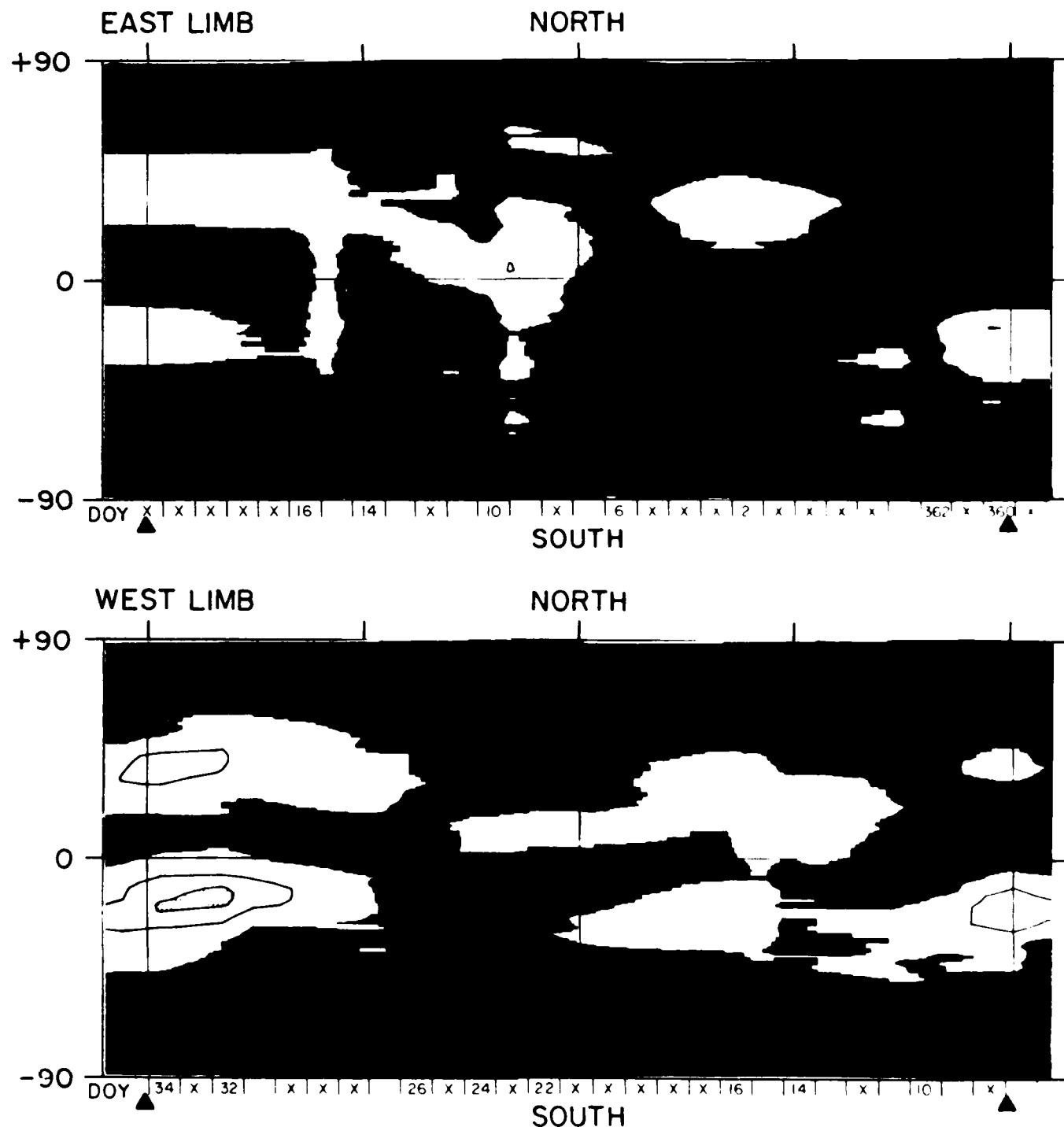
**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK****Fe XIV, 5303 Å CORONAL PHOTOMETER****ROTATION 1648 HEIGHT 1.15 R<sub>⊕</sub> YEAR 1976**

X = NO DATA

**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK****Fe XIV, 5303 Å CORONAL PHOTOMETER****ROTATION 1649 HEIGHT 1.15 R<sub>o</sub> YEAR 1976**

0 4 8 12 16 20 24 28 MIL  
[Scale bar markings]

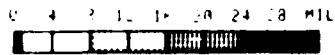
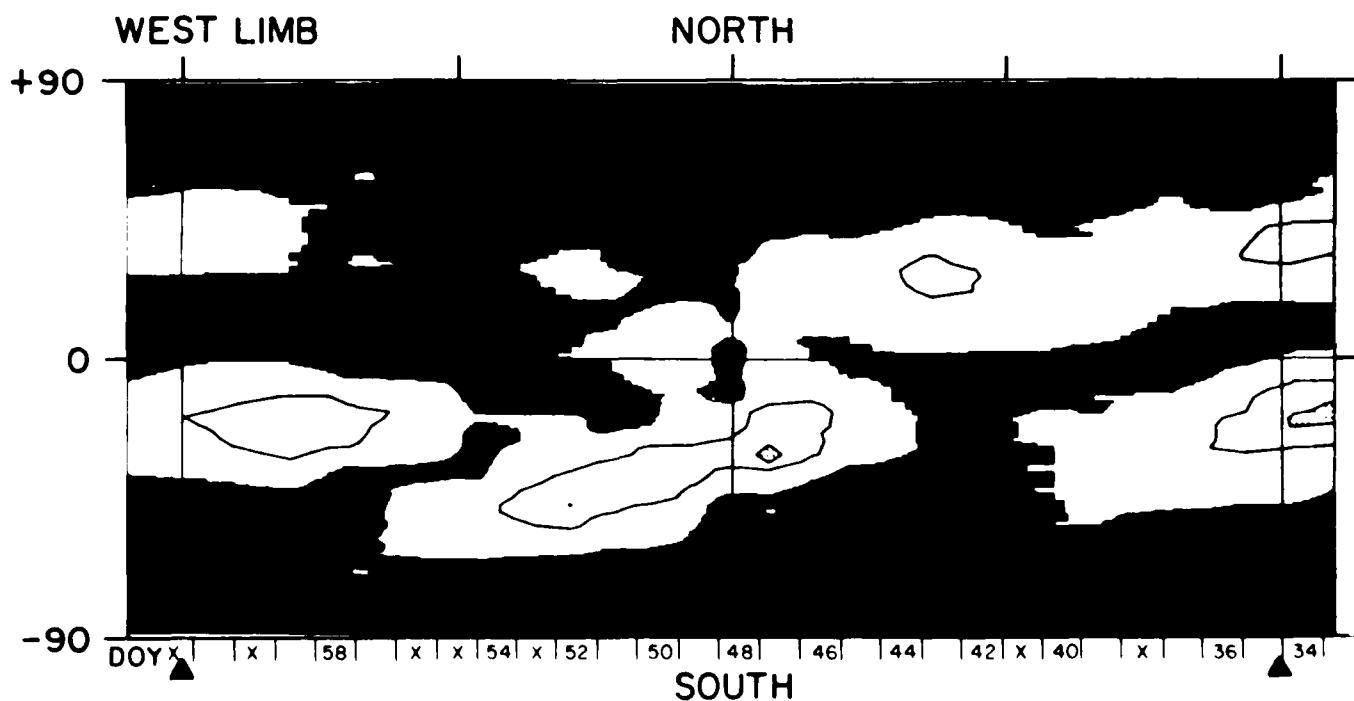
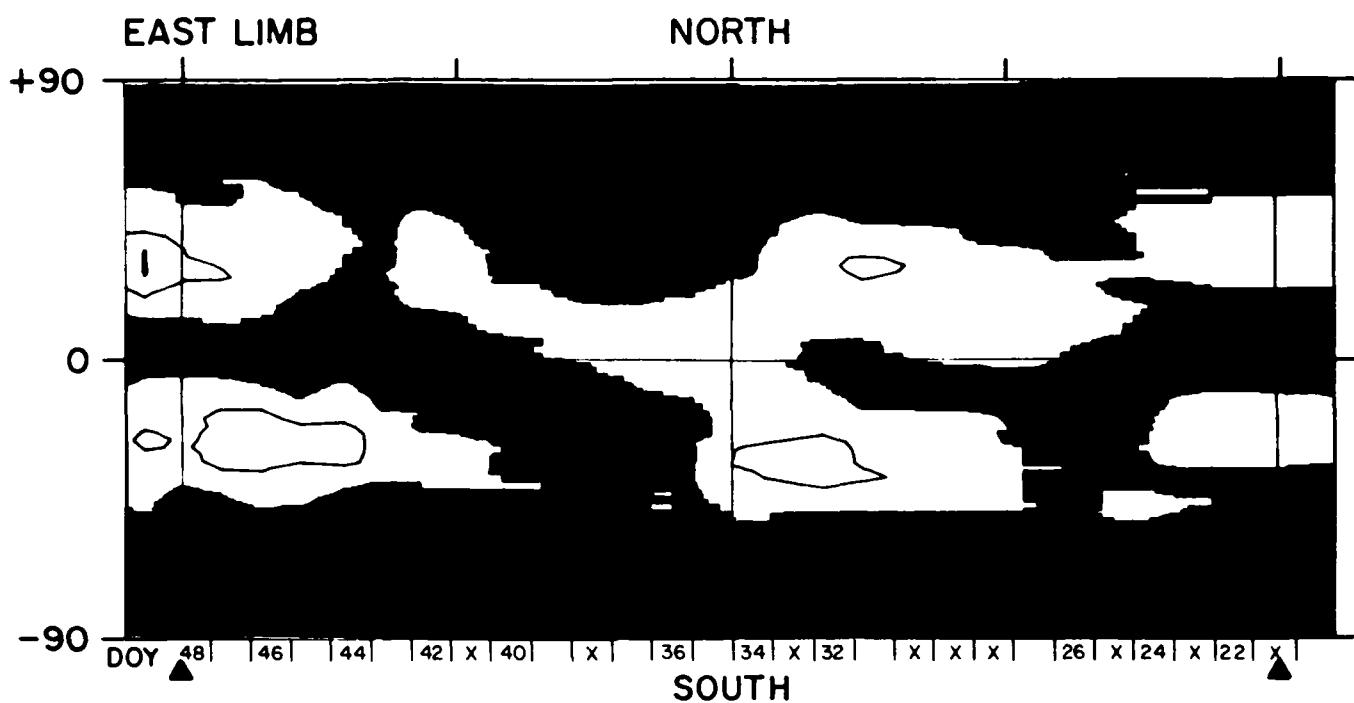
X = NO DATA

**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK****Fe XIV, 5303 Å CORONAL PHOTOMETER****ROTATION 1650 HEIGHT 1.15 R<sub>⊕</sub> YEAR 1977****X = NO DATA**

**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK**

**Fe XIV, 5303 Å CORONAL PHOTOMETER**

**ROTATION 1651     HEIGHT 1.15 R<sub>o</sub>     YEAR 1977**

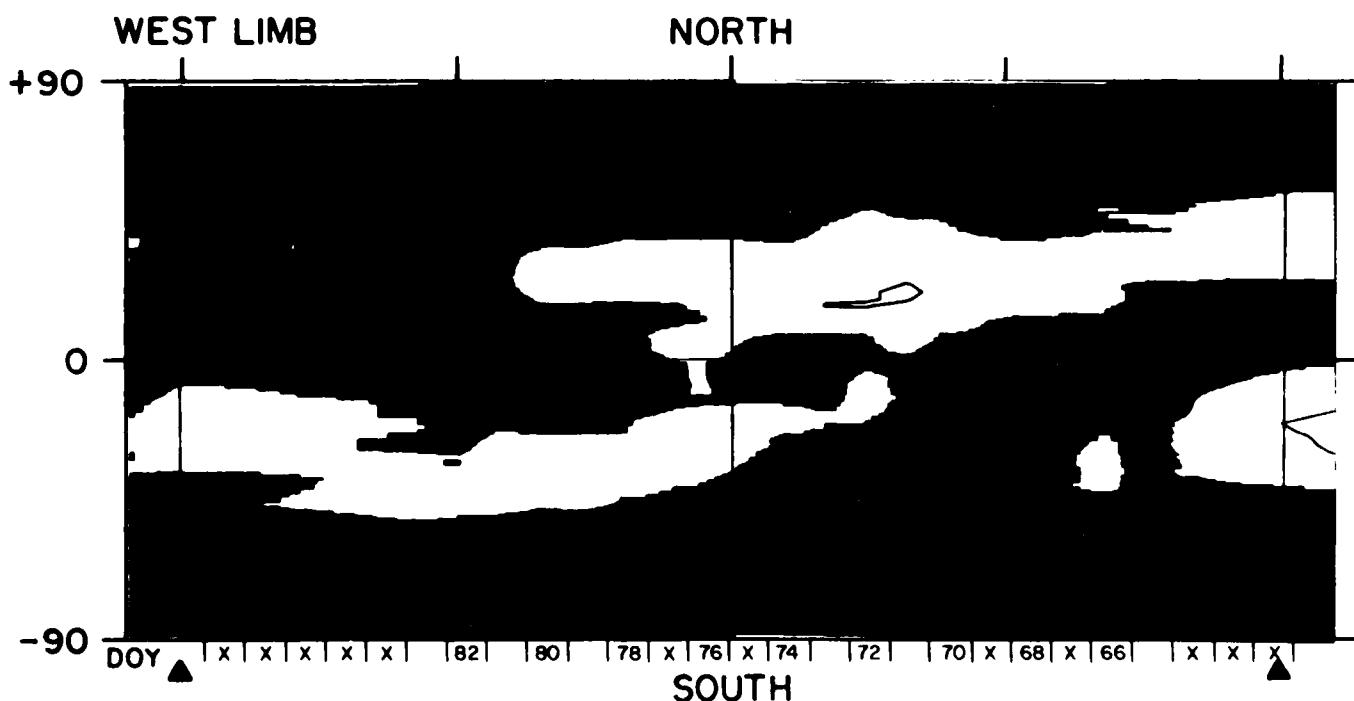
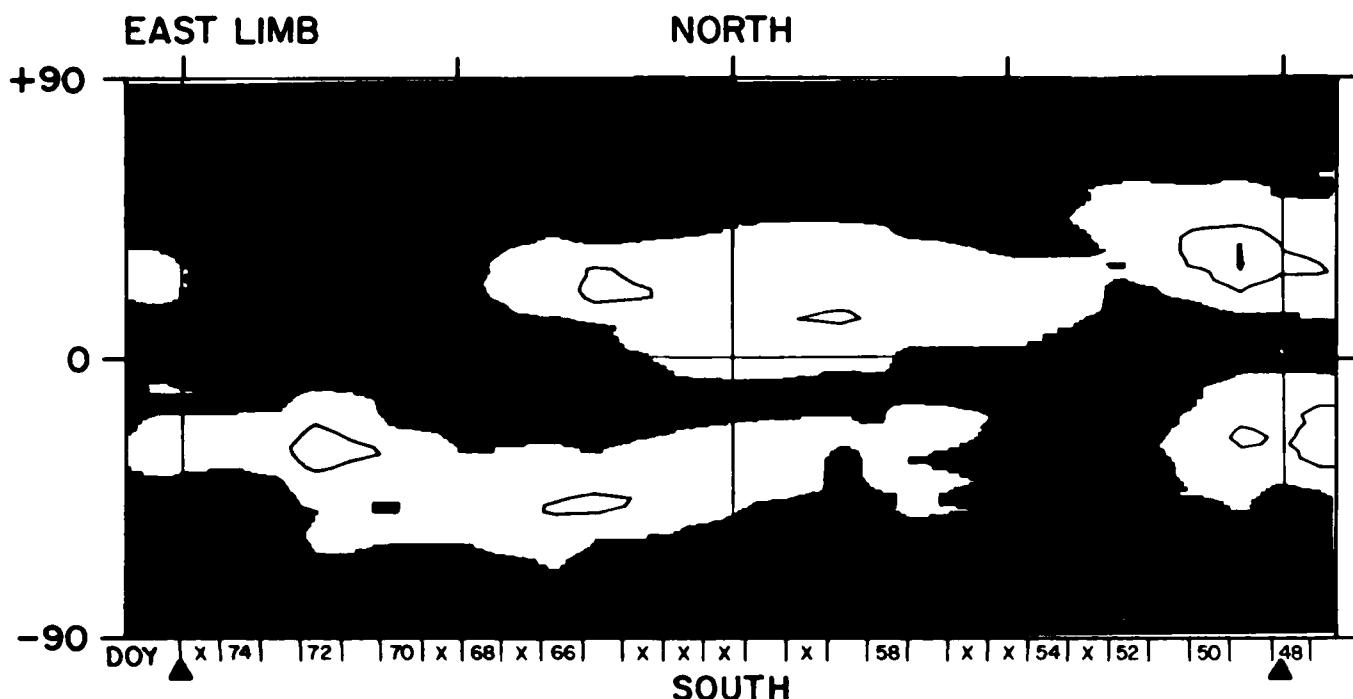


X = NO DATA

NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

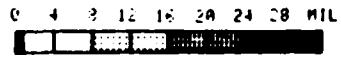
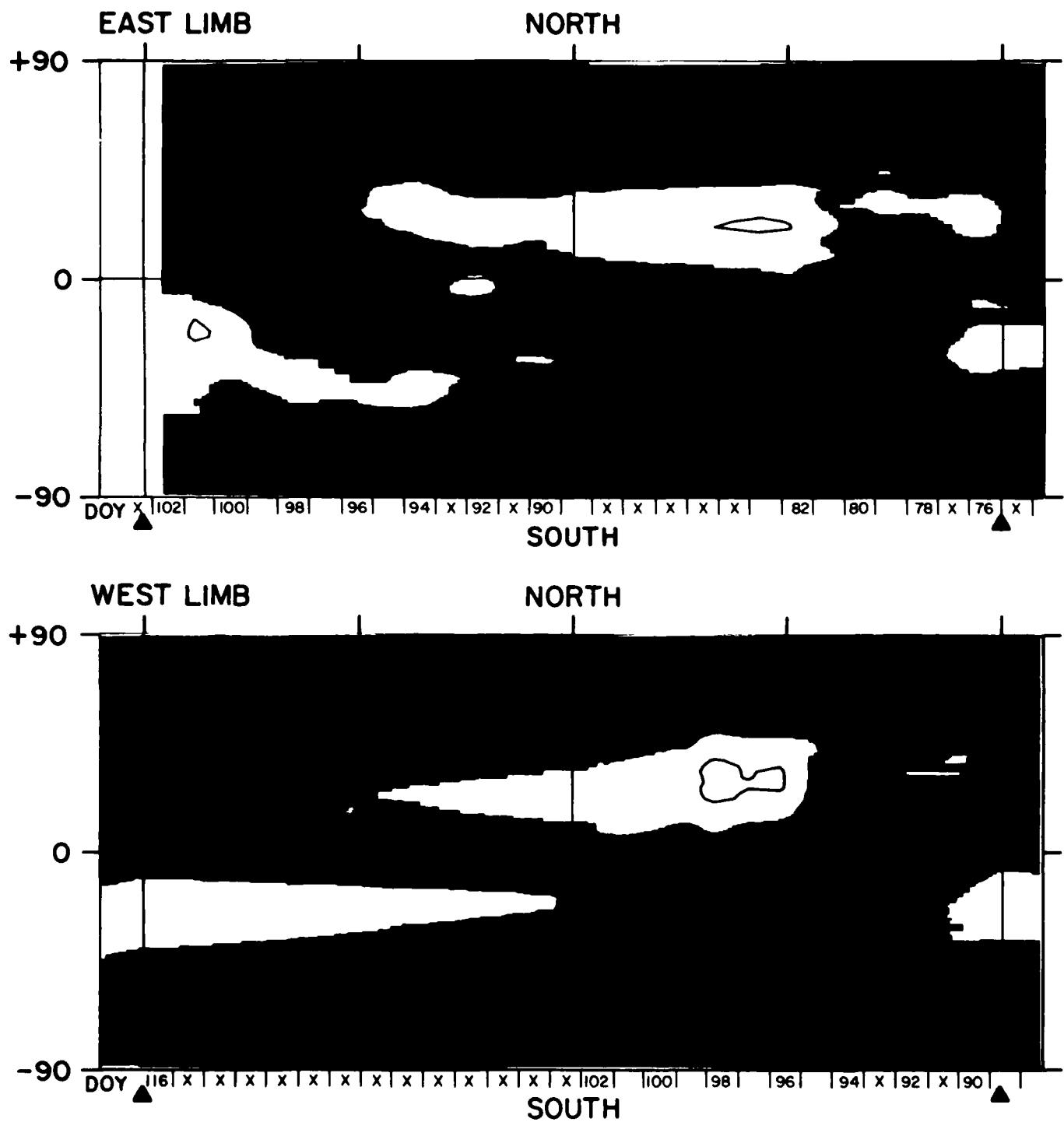
Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1652 HEIGHT 1.15 R<sub>o</sub> YEAR 1977



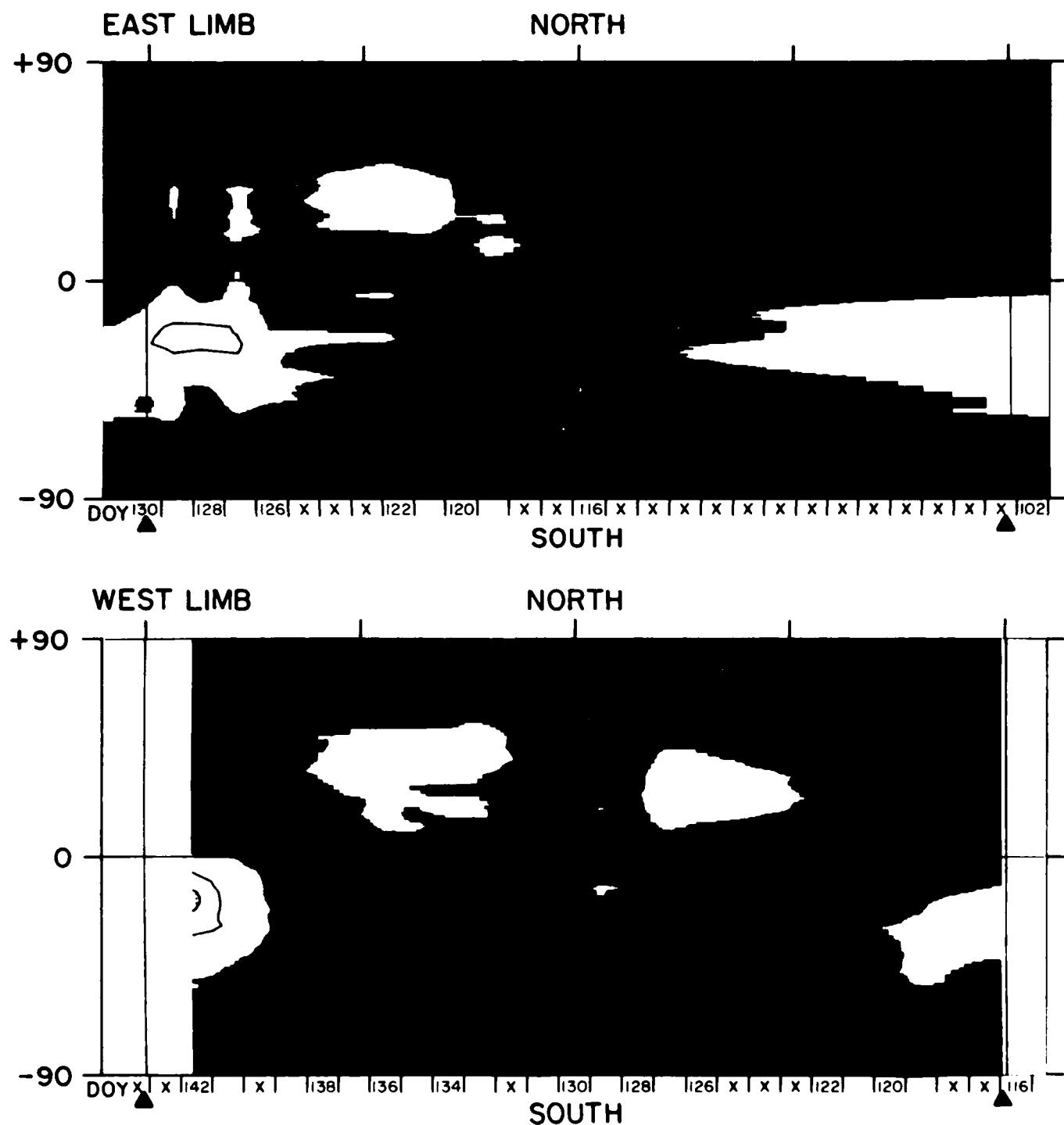
0 4 8 12 16 20 24 28 MIL  
with limb

X = NO DATA

**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK****Fe XIV, 5303 Å CORONAL PHOTOMETER****ROTATION 1653 HEIGHT 1.15 R<sub>•</sub> YEAR 1977****X = NO DATA**

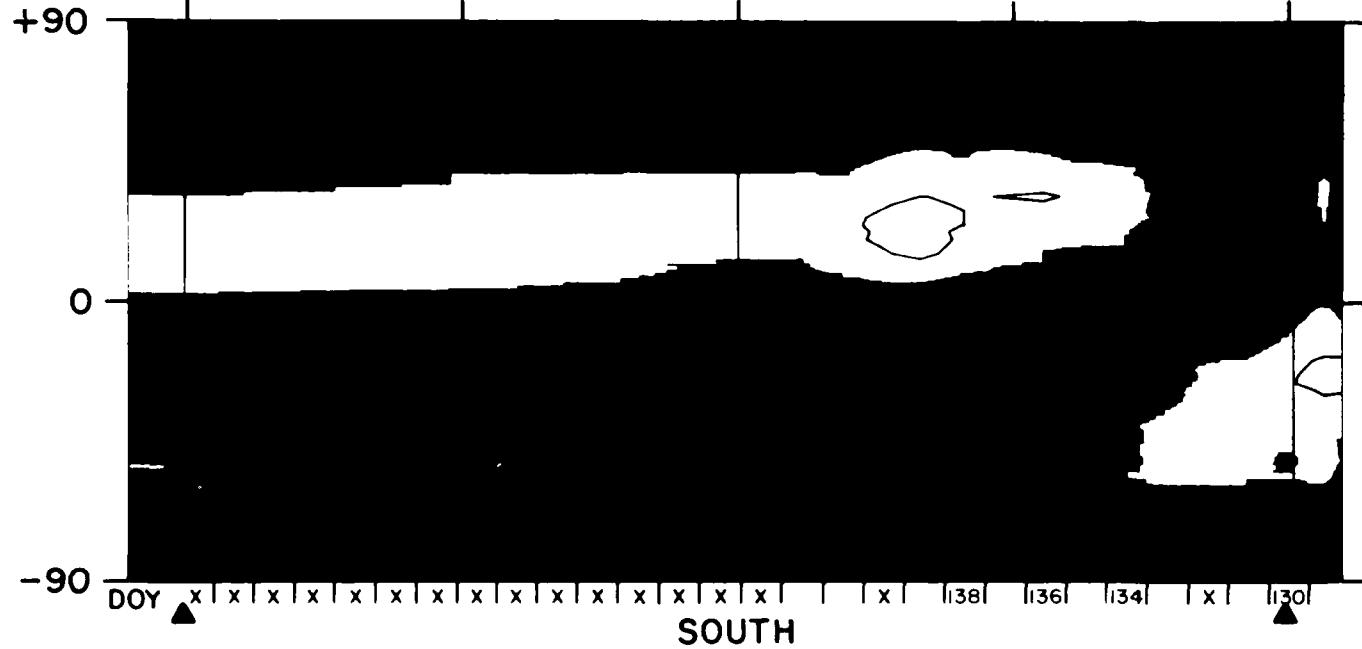
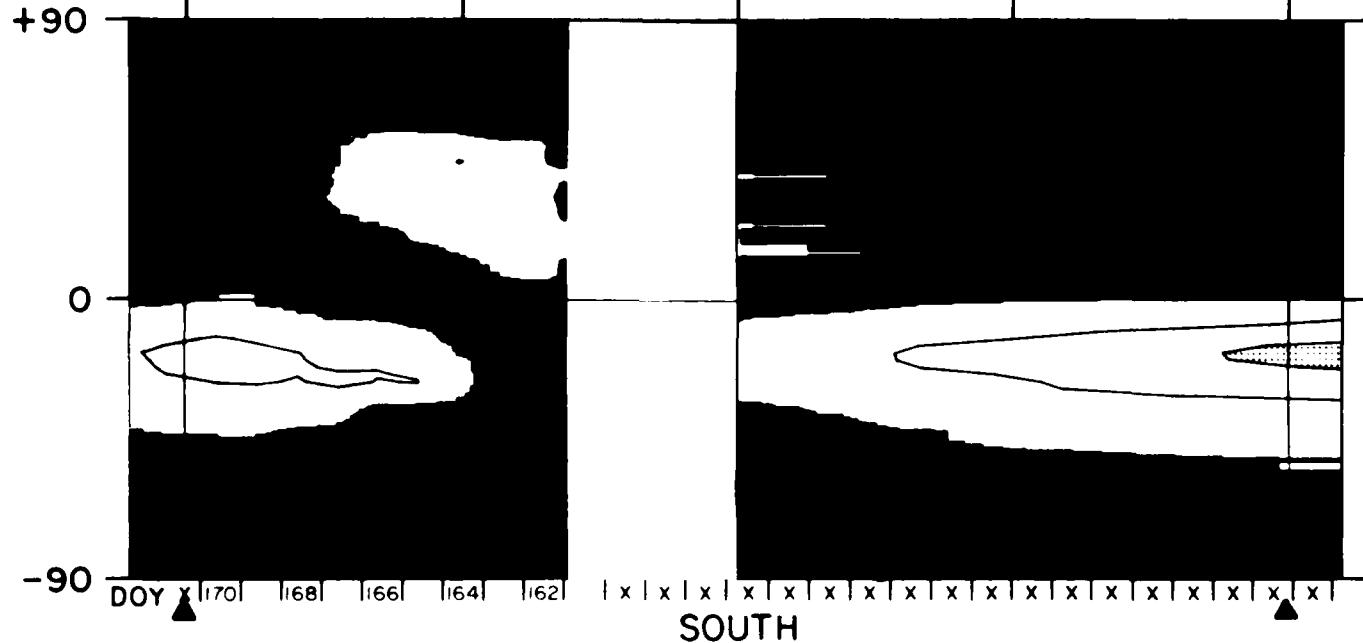
**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK**

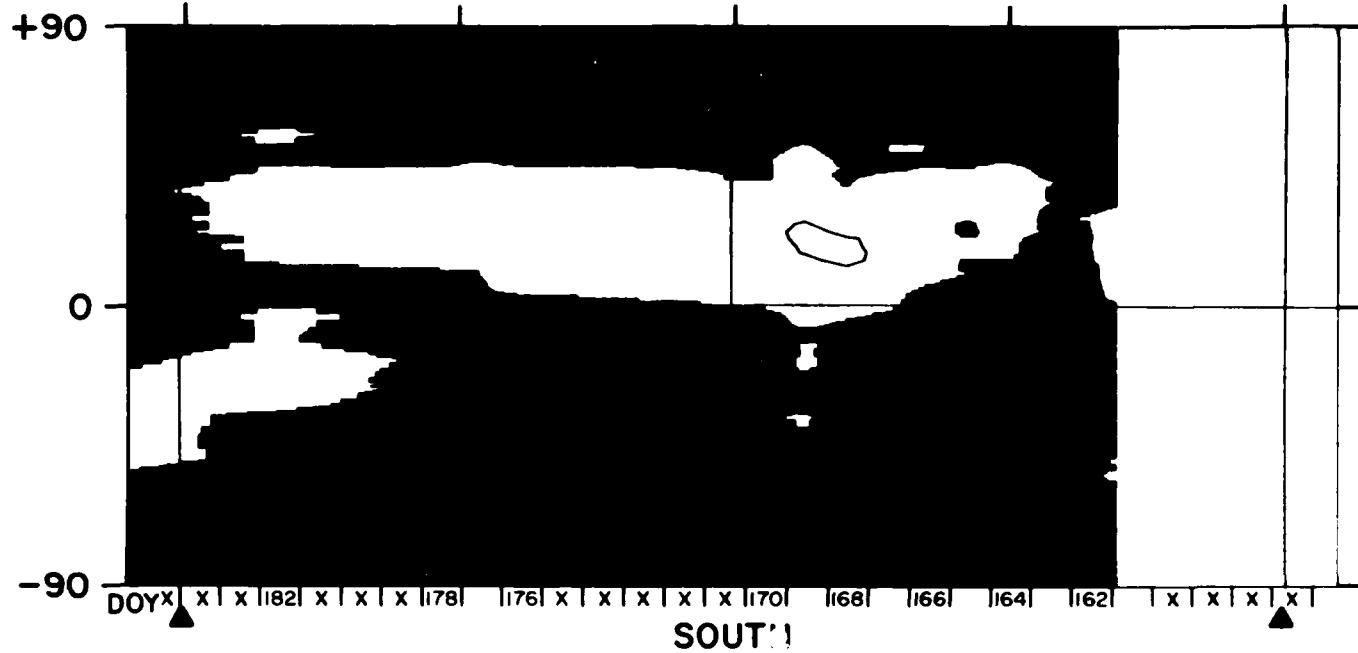
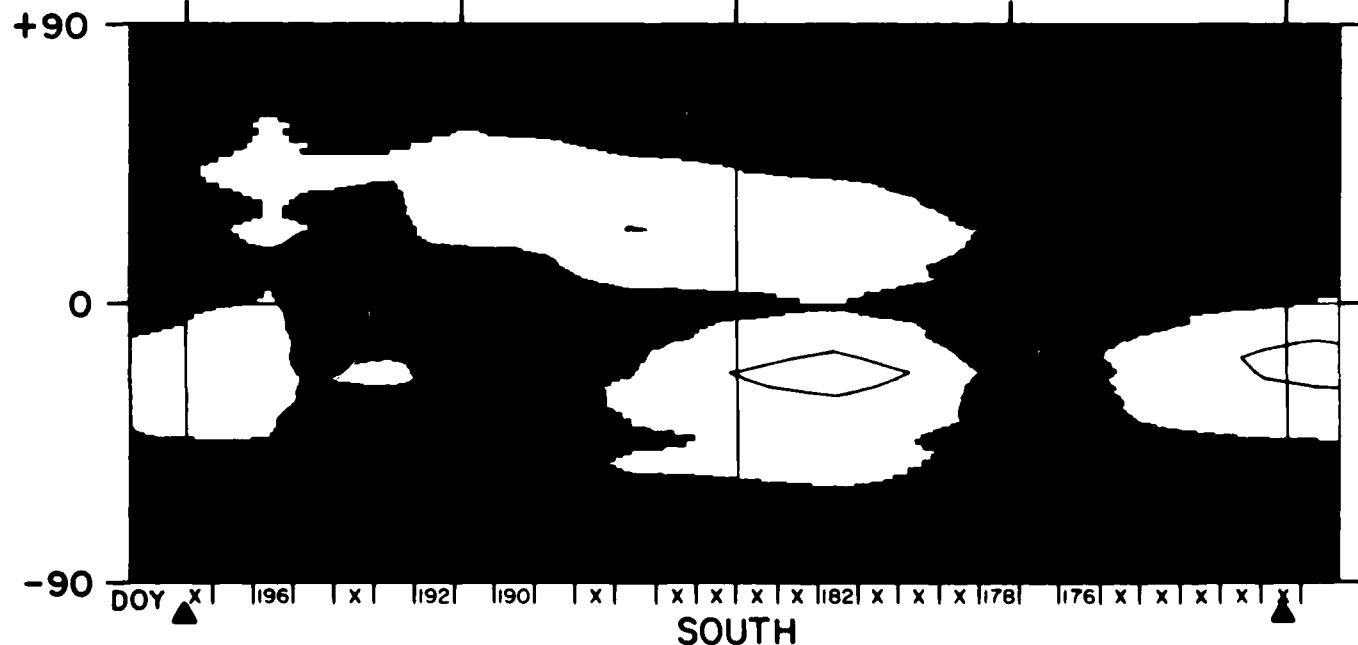
Fe XIV, 5303 Å CORONAL PHOTOMETER  
ROTATION 1654 HEIGHT 1.15 R<sub>o</sub> YEAR 1977



0 4 8 12 16 20 24 28 MIL

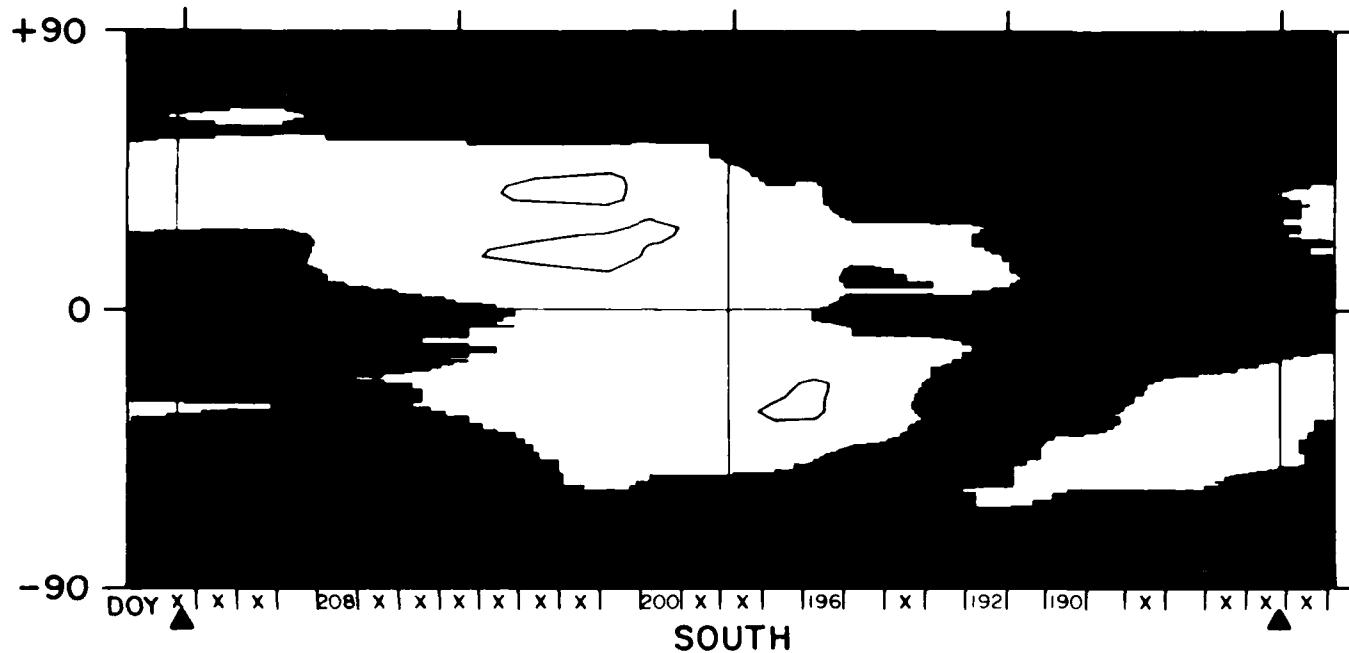
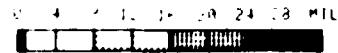
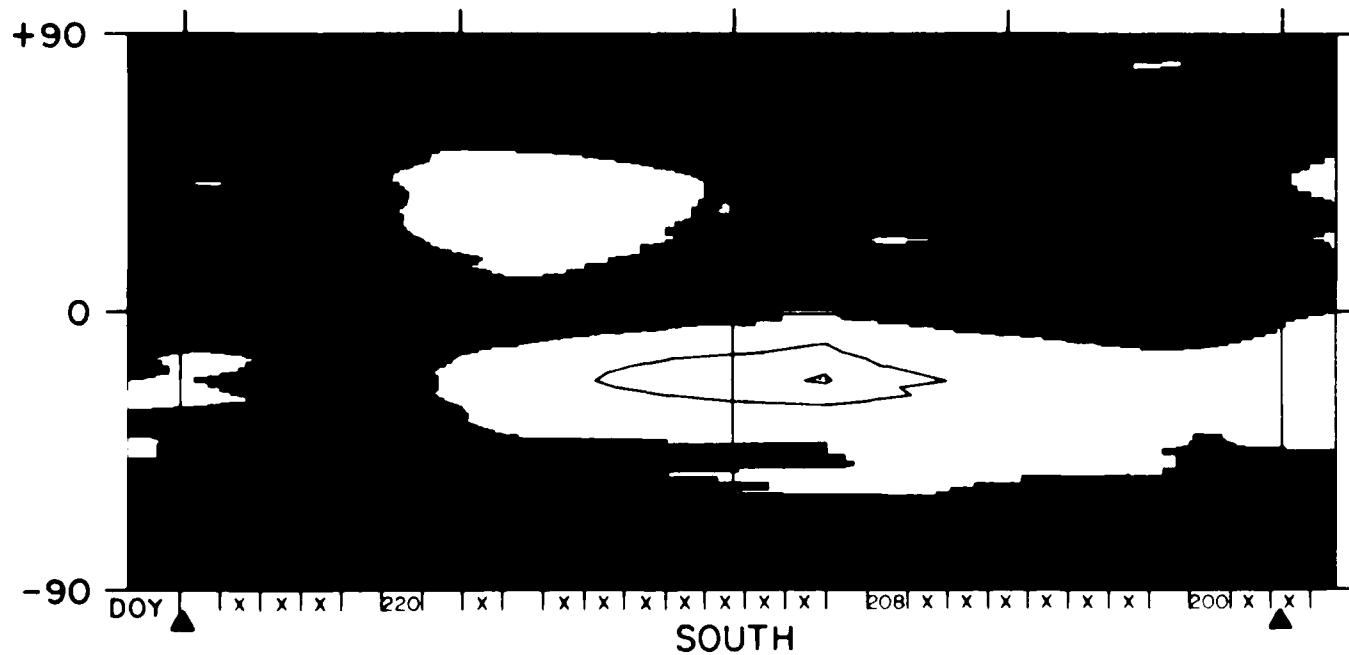
X = NO DATA

**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK****Fe XIV, 5303 Å CORONAL PHOTOMETER****ROTATION 1655 HEIGHT 1.15 R<sub>⊕</sub> YEAR 1977****EAST LIMB****NORTH****WEST LIMB****NORTH****X = NO DATA**

**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK****Fe XIV, 5303 Å CORONAL PHOTOMETER****ROTATION 1656 HEIGHT 1.15R<sub>⊕</sub> YEAR 1977****EAST LIMB****NORTH****WEST LIMB****NORTH**

0 4 8 12 16 20 24 28 MIL  
[Scale bar markings]

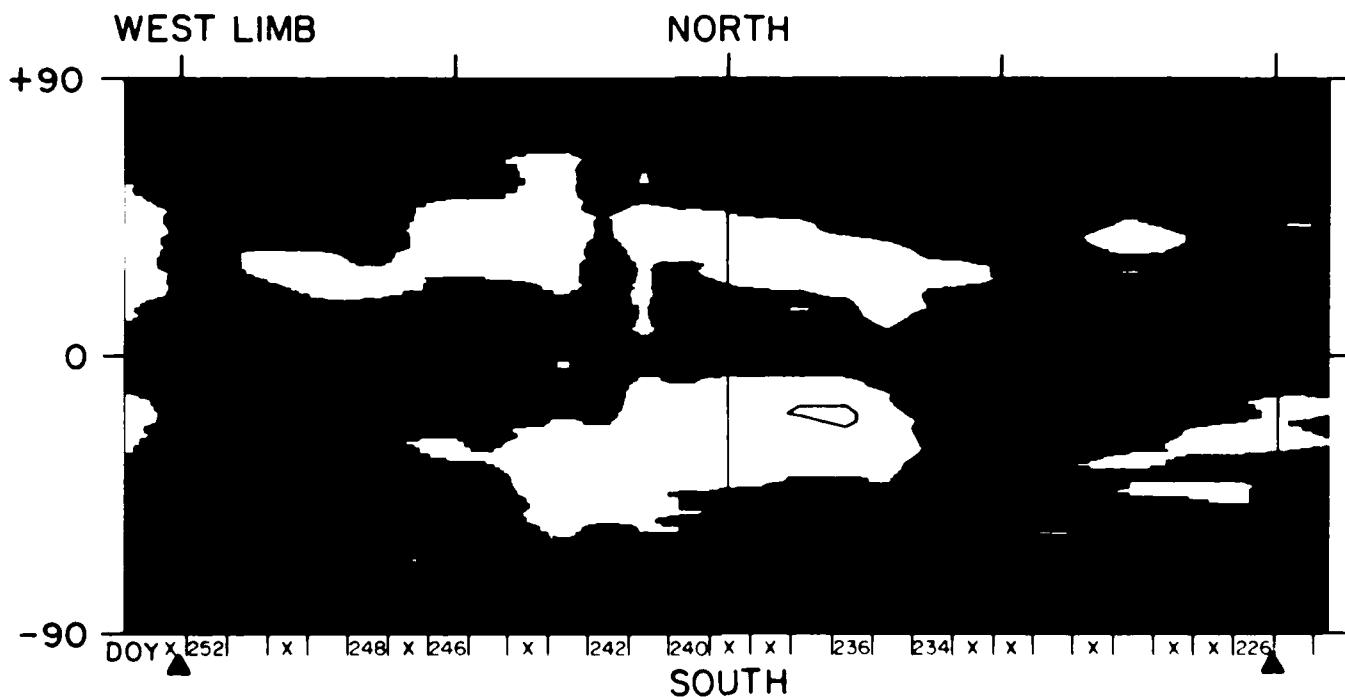
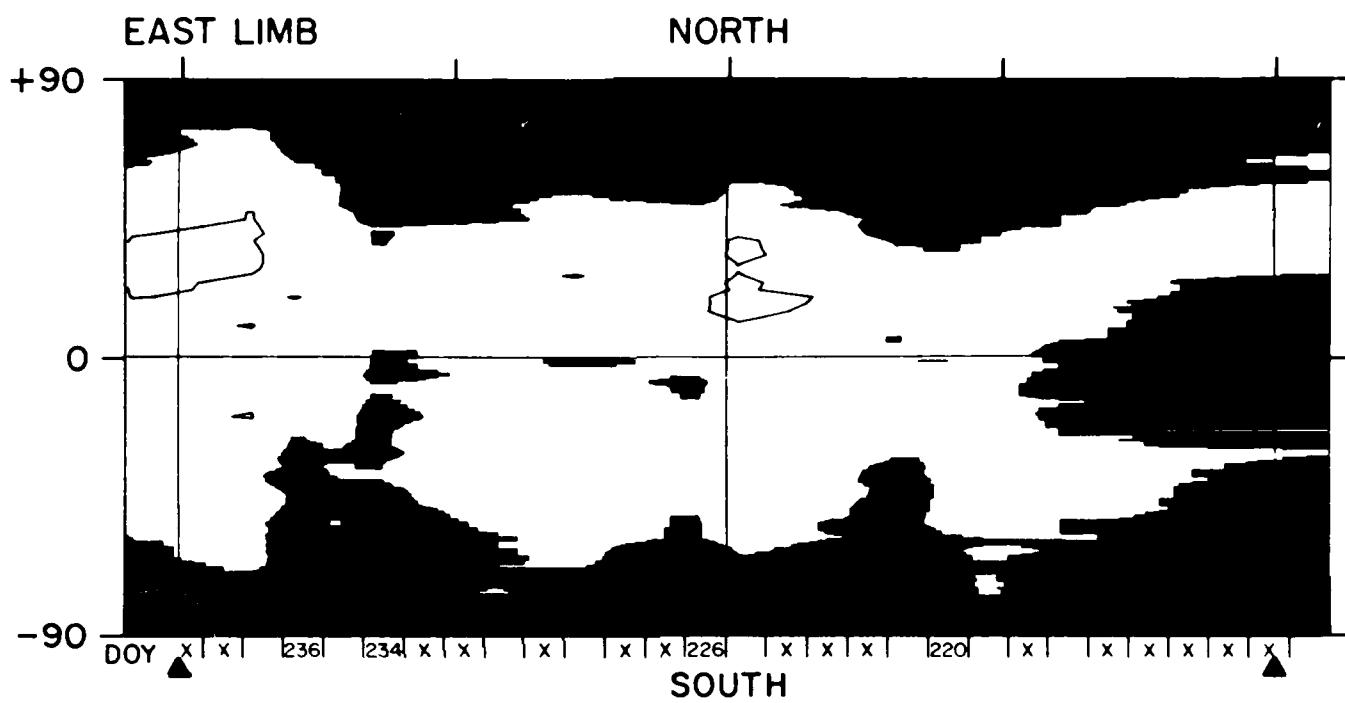
X = NO DATA

**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK****Fe XIV, 5303 Å CORONAL PHOTOMETER****ROTATION 1657 HEIGHT 1.15 R<sub>⊕</sub> YEAR 1977****EAST LIMB****NORTH****WEST LIMB****NORTH****X = NO DATA**

# NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1658 HEIGHT 1.15 R<sub>o</sub> YEAR 1977

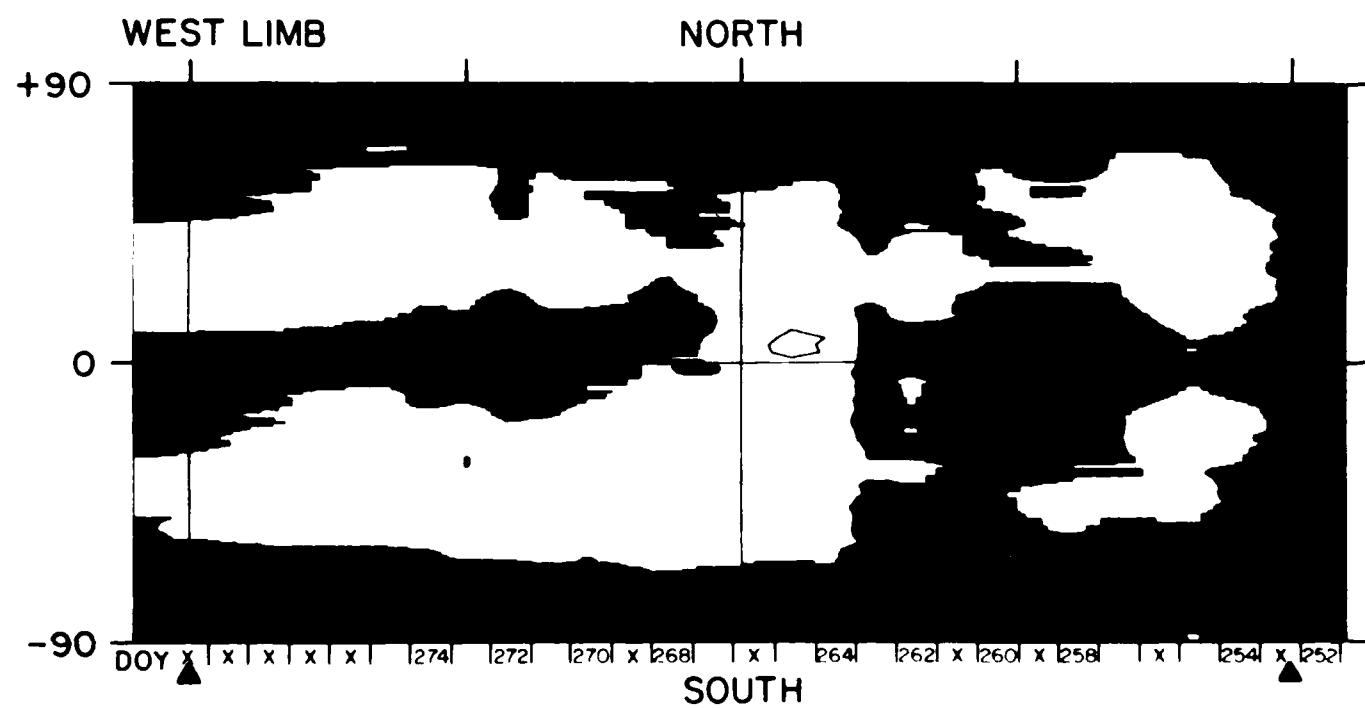
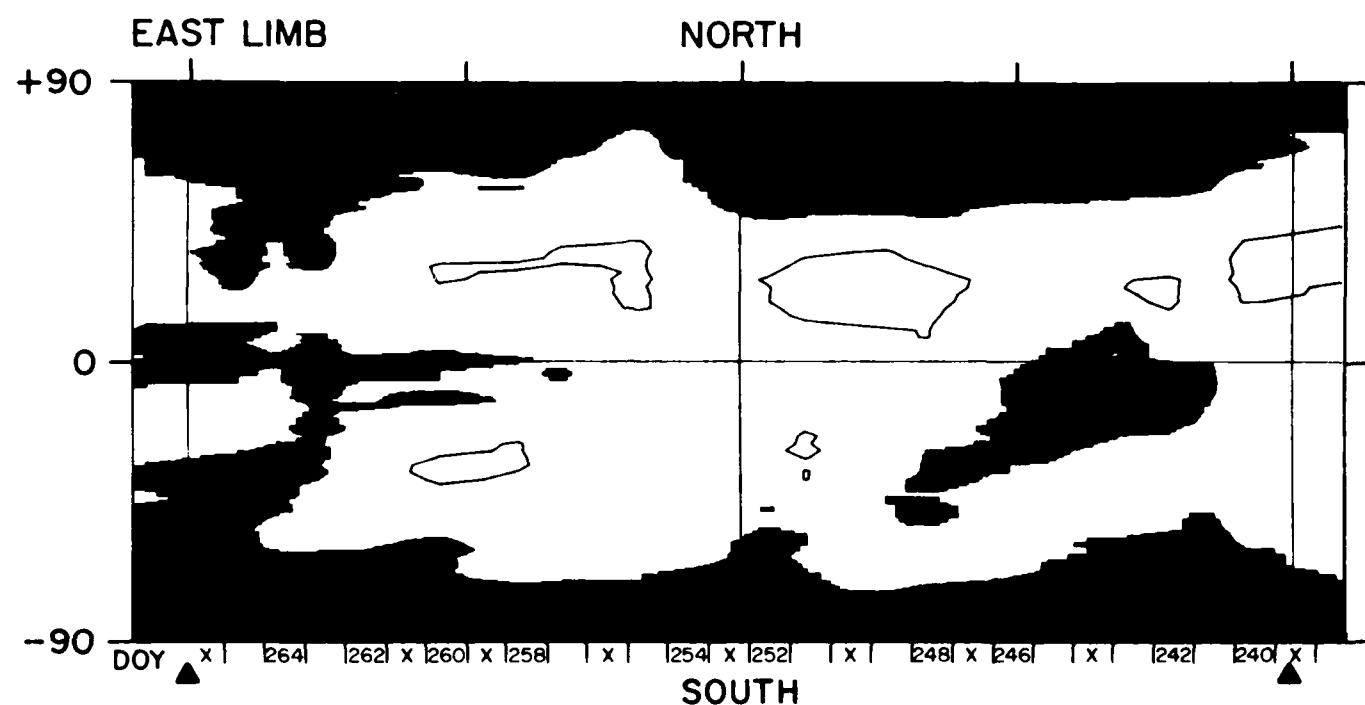


X = NO DATA

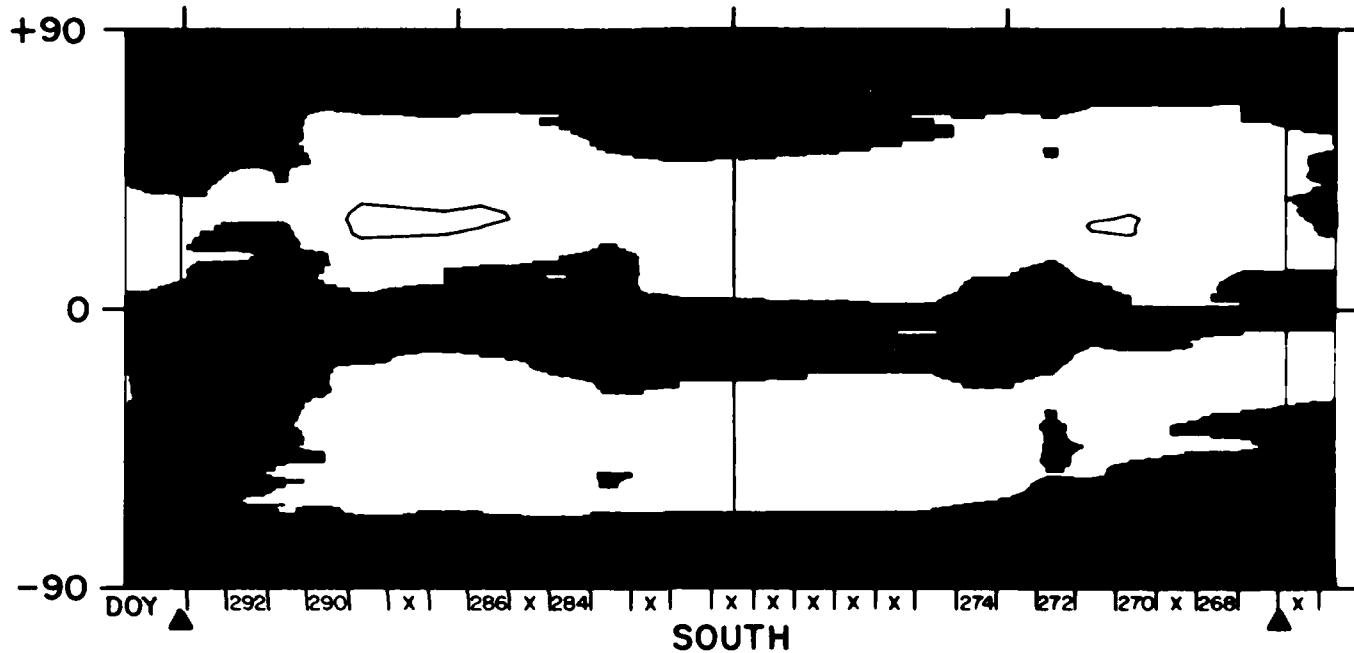
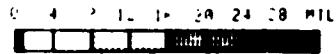
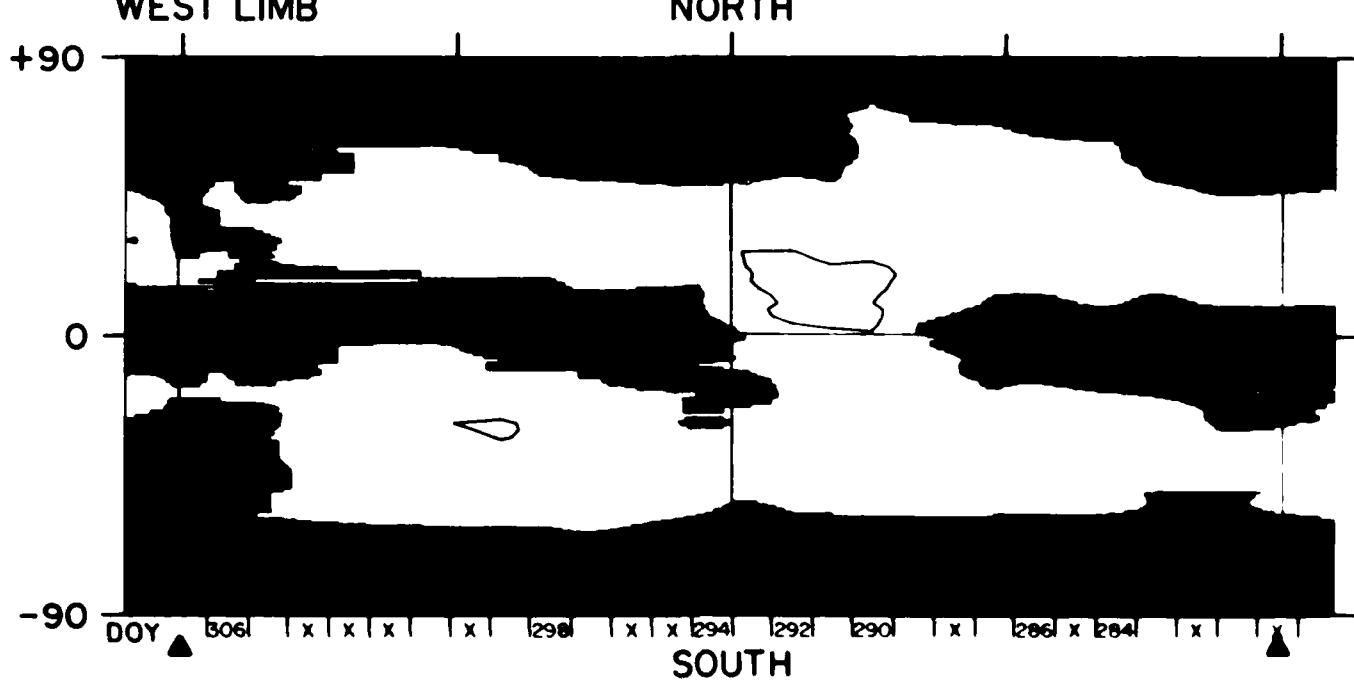
NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

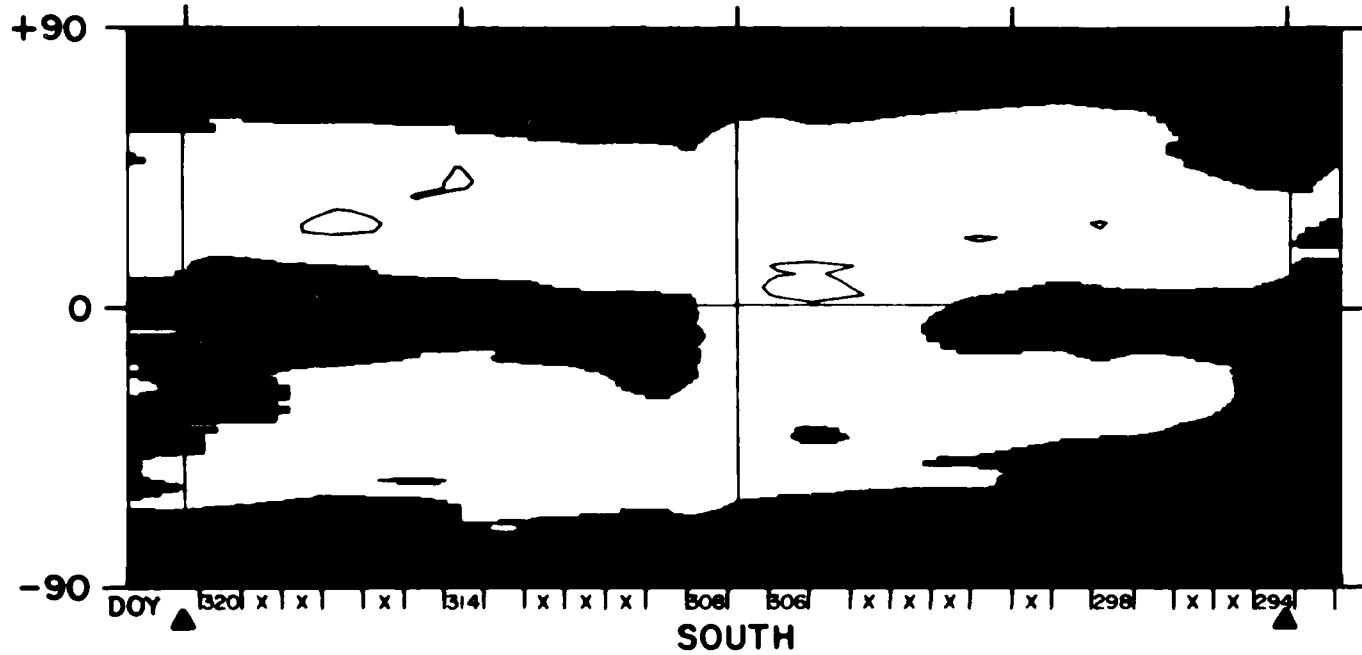
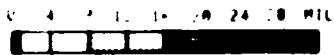
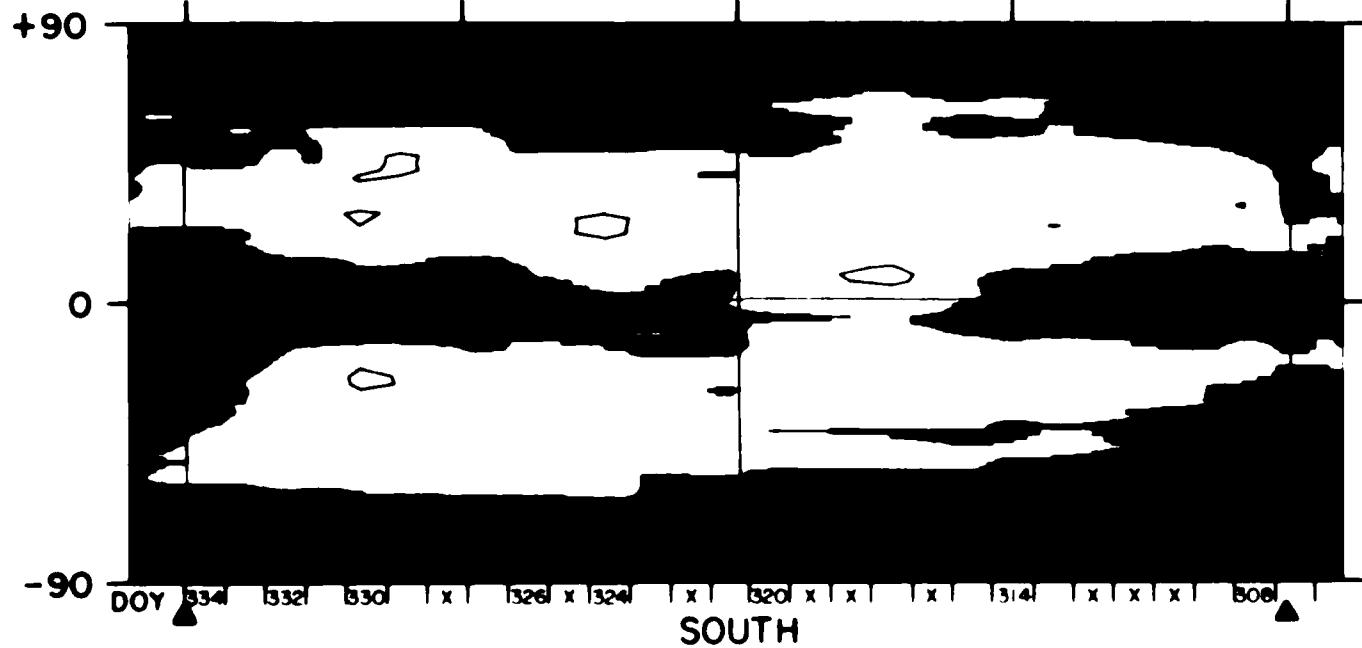
Fe XIV, 5303 Å CORONAL PHOTOMETER

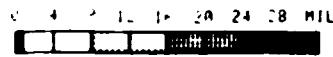
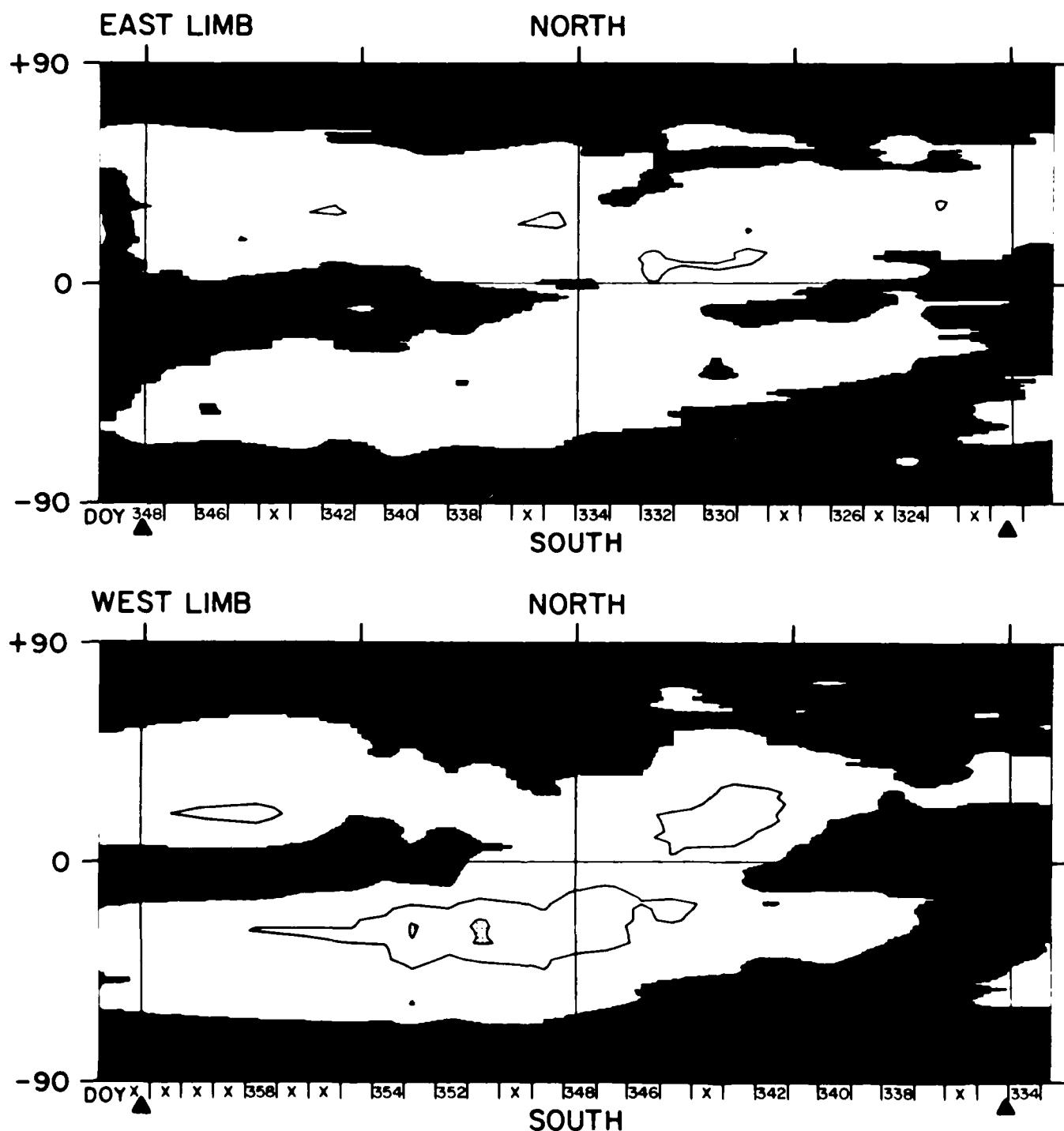
ROTATION 1659 HEIGHT 1.15 R<sub>⊕</sub> YEAR 1977



X = NO DATA

**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK****Fe XIV, 5303 Å CORONAL PHOTOMETER****ROTATION 1660 HEIGHT 1.15 R<sub>o</sub> YEAR 1977****EAST LIMB****NORTH****WEST LIMB****NORTH****X = NO DATA**

**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK****Fe XIV, 5303 Å CORONAL PHOTOMETER****ROTATION 1661 HEIGHT 1.15 R<sub>•</sub> YEAR 1977****EAST LIMB****NORTH****WEST LIMB****NORTH****X = NO DATA**

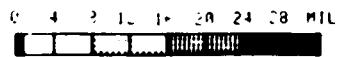
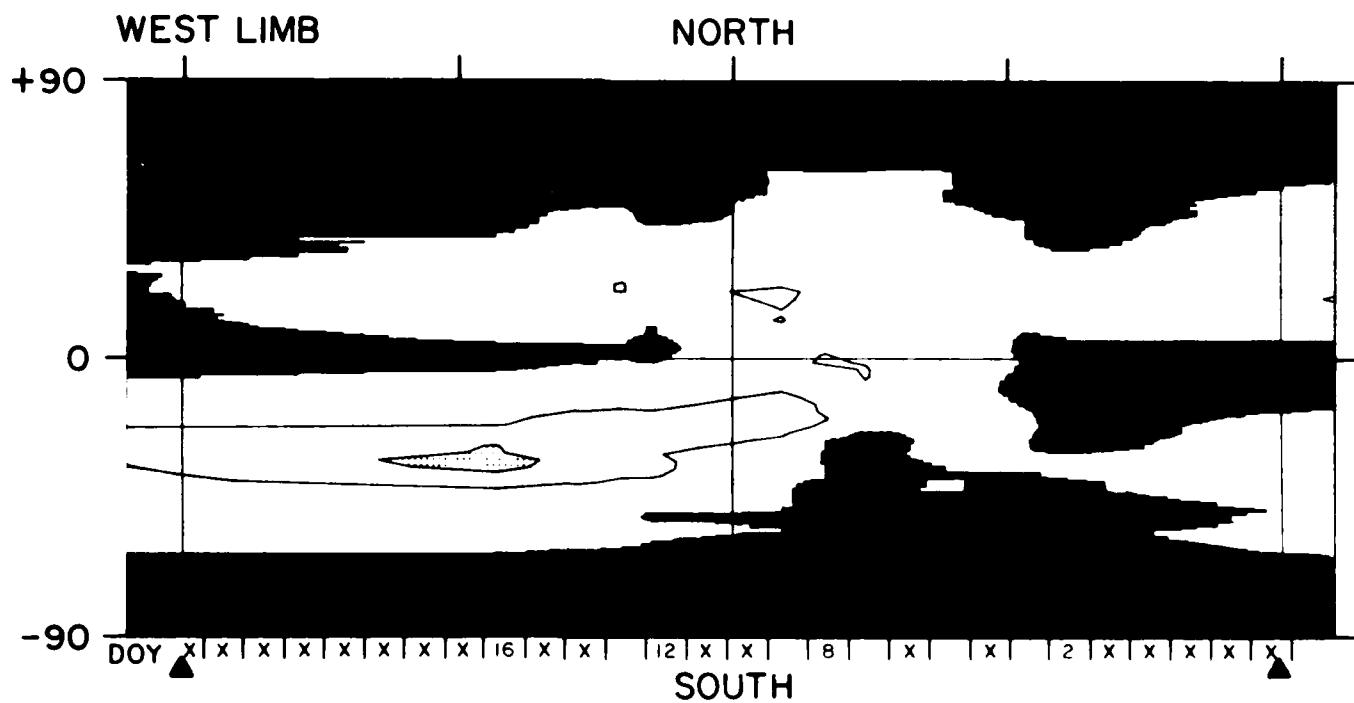
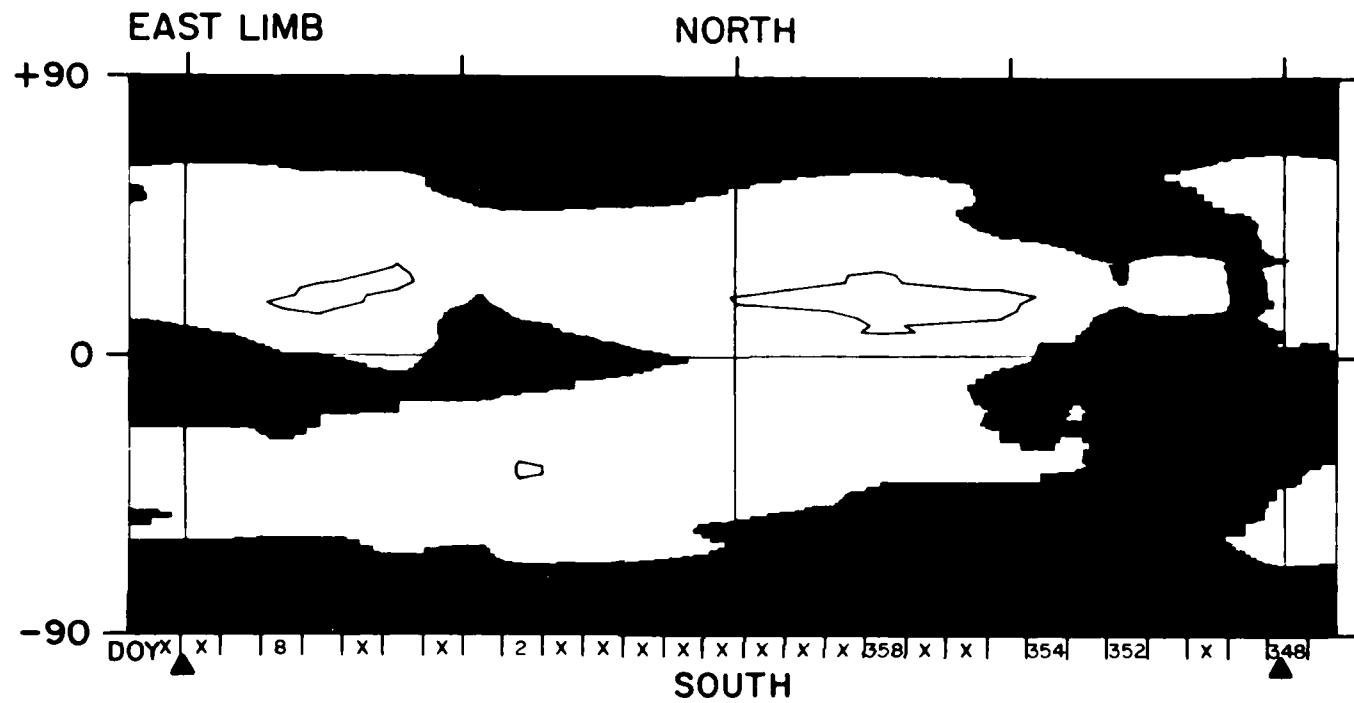
**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK****Fe XIV, 5303 Å CORONAL PHOTOMETER****ROTATION 1662 HEIGHT 1.15 R<sub>o</sub> YEAR 1977**

X = NO DATA

NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1663 HEIGHT 1.15 R<sub>⊕</sub> YEAR 1977

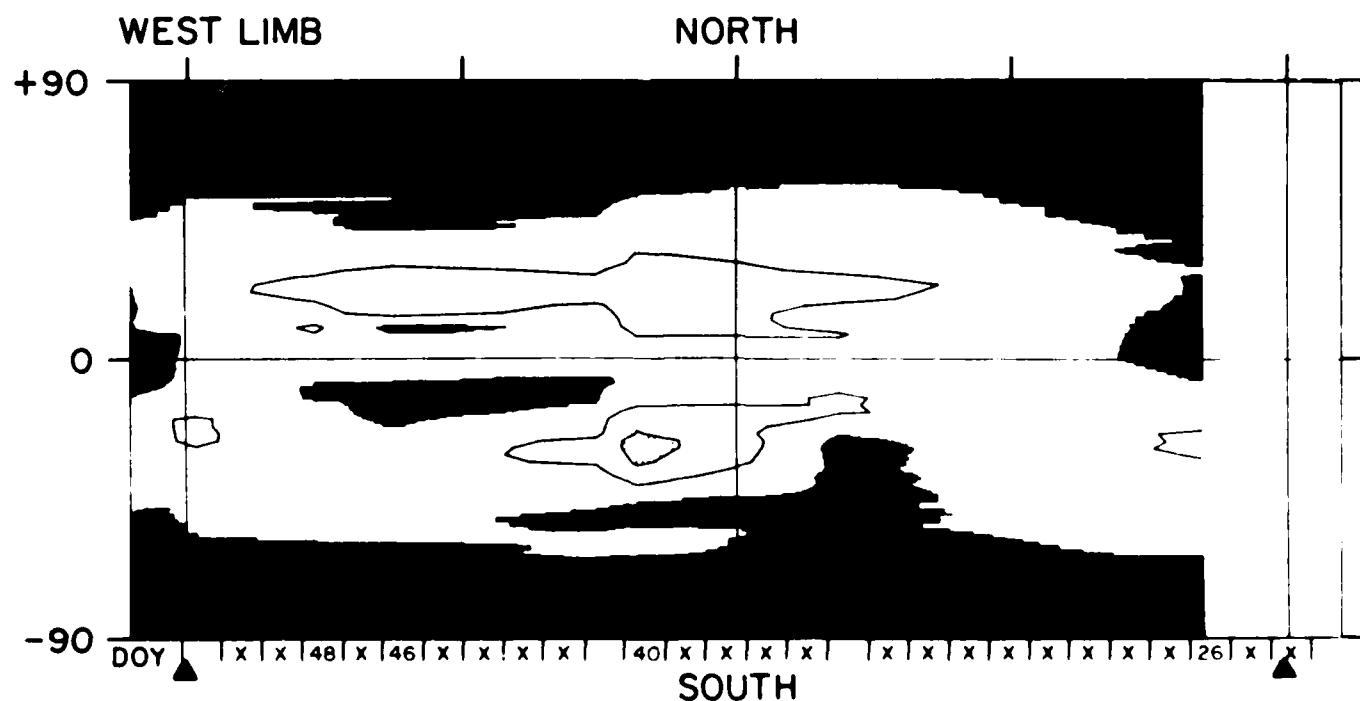
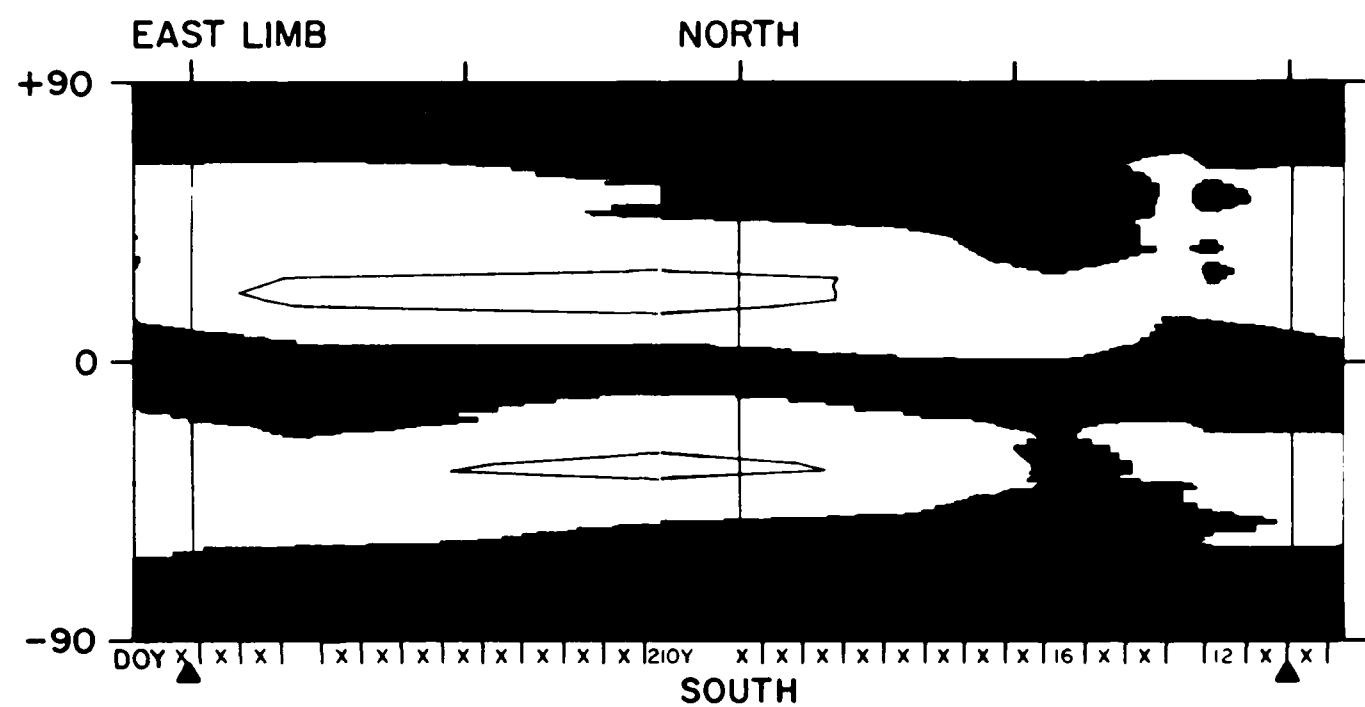


X = NO DATA

NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1664 HEIGHT 1.15 R<sub>⊕</sub> YEAR 1978

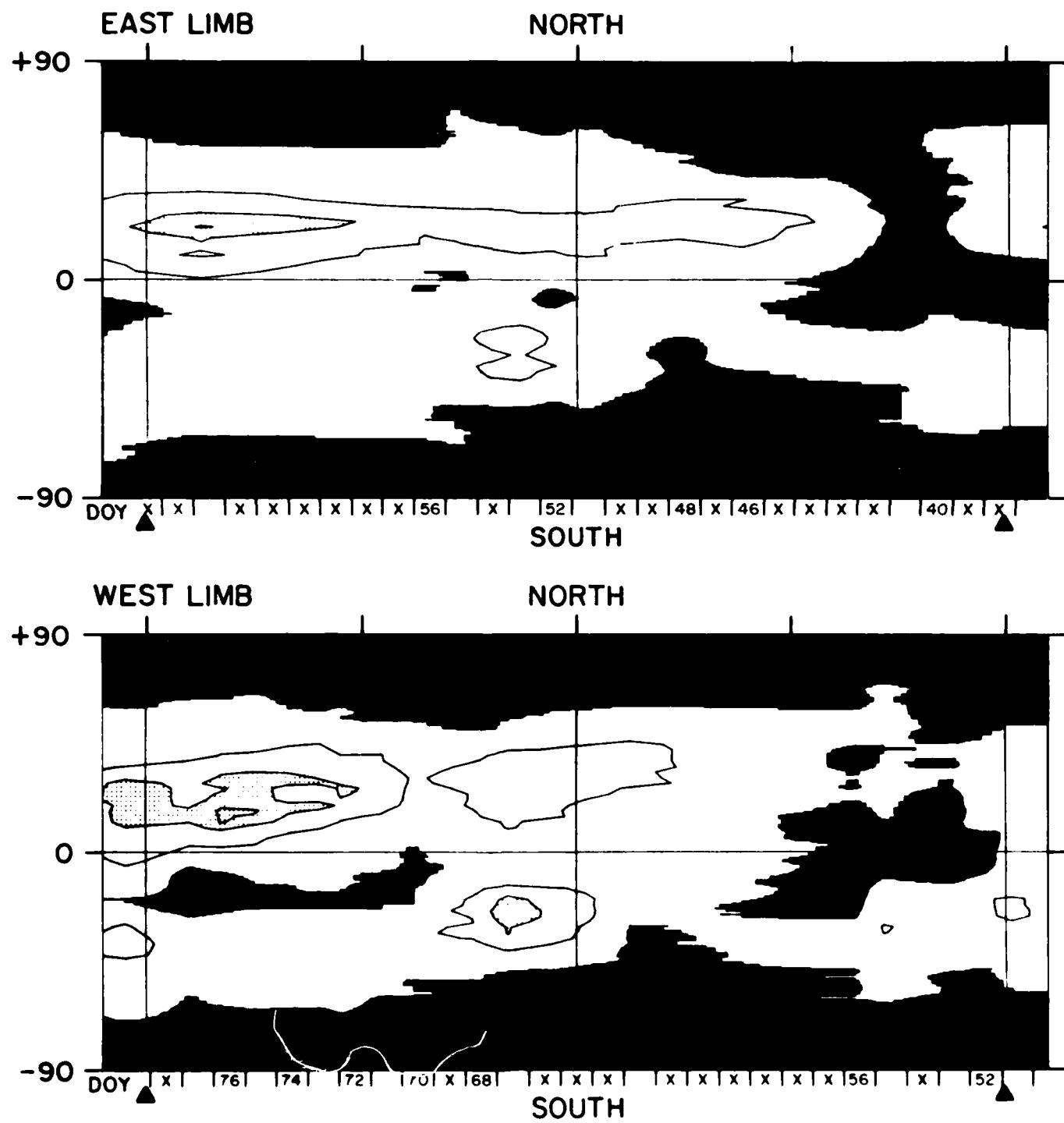


X = NO DATA

NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1665 HEIGHT 1.15 R<sub>o</sub> YEAR 1978



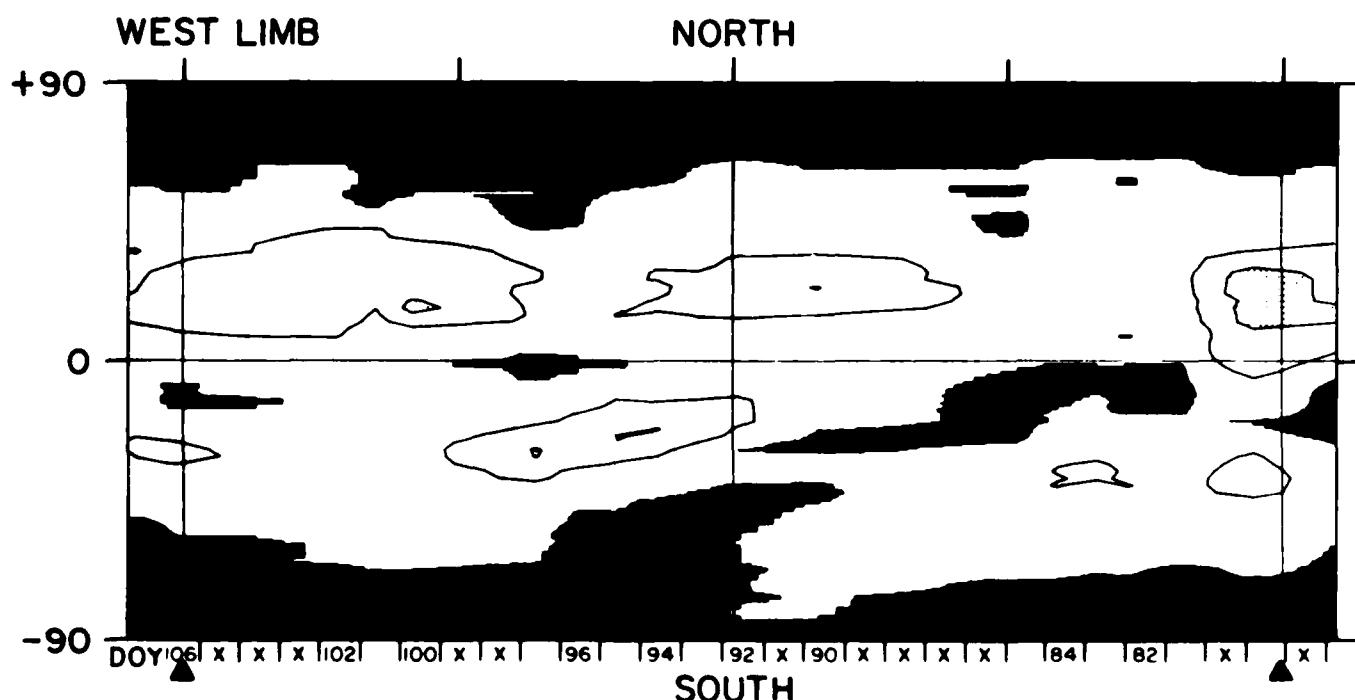
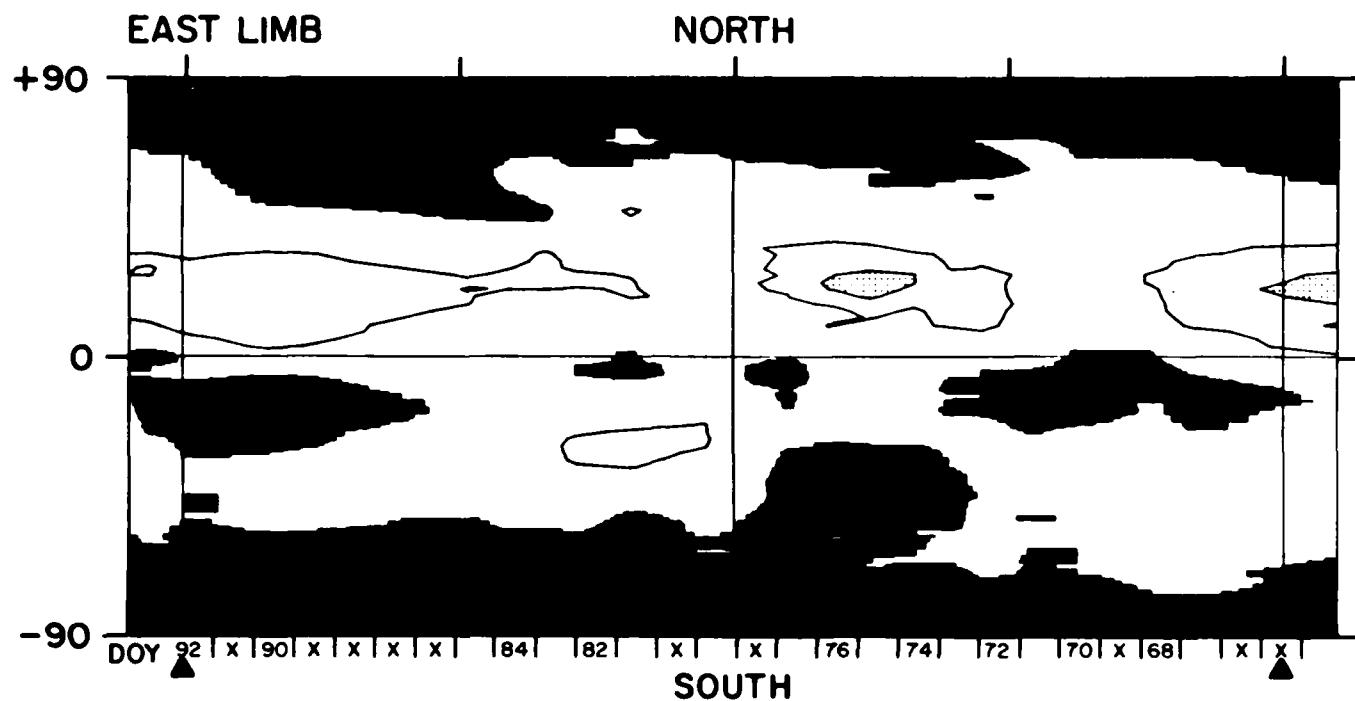
0 4 8 12 16 20 24 28 MIL  
with scale

X = NO DATA

NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1666 HEIGHT 1.15 R<sub>o</sub> YEAR 1978

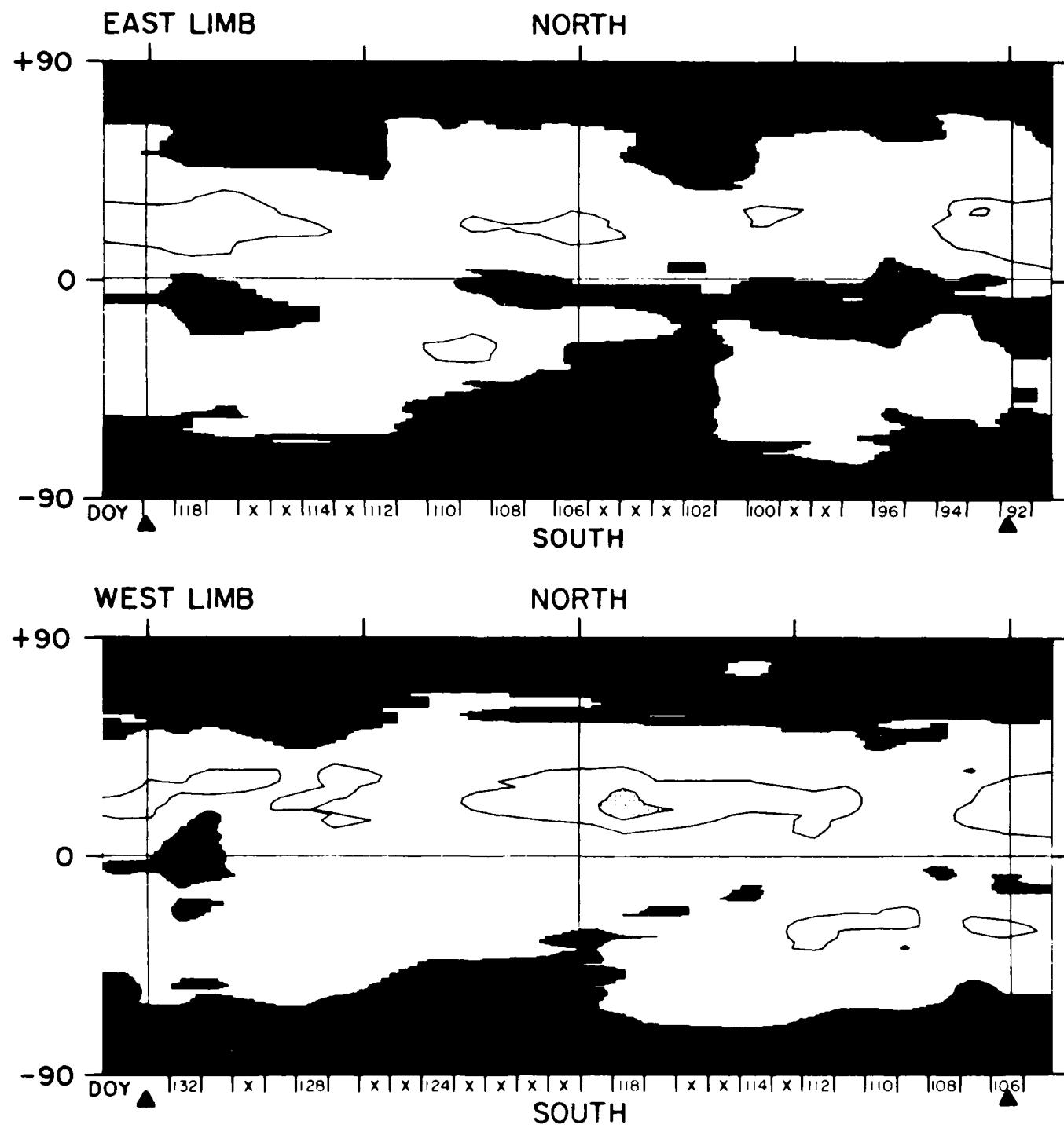


X = NO DATA

# NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1667 HEIGHT 1.15 R<sub>⊕</sub> YEAR 1978



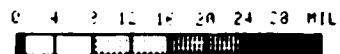
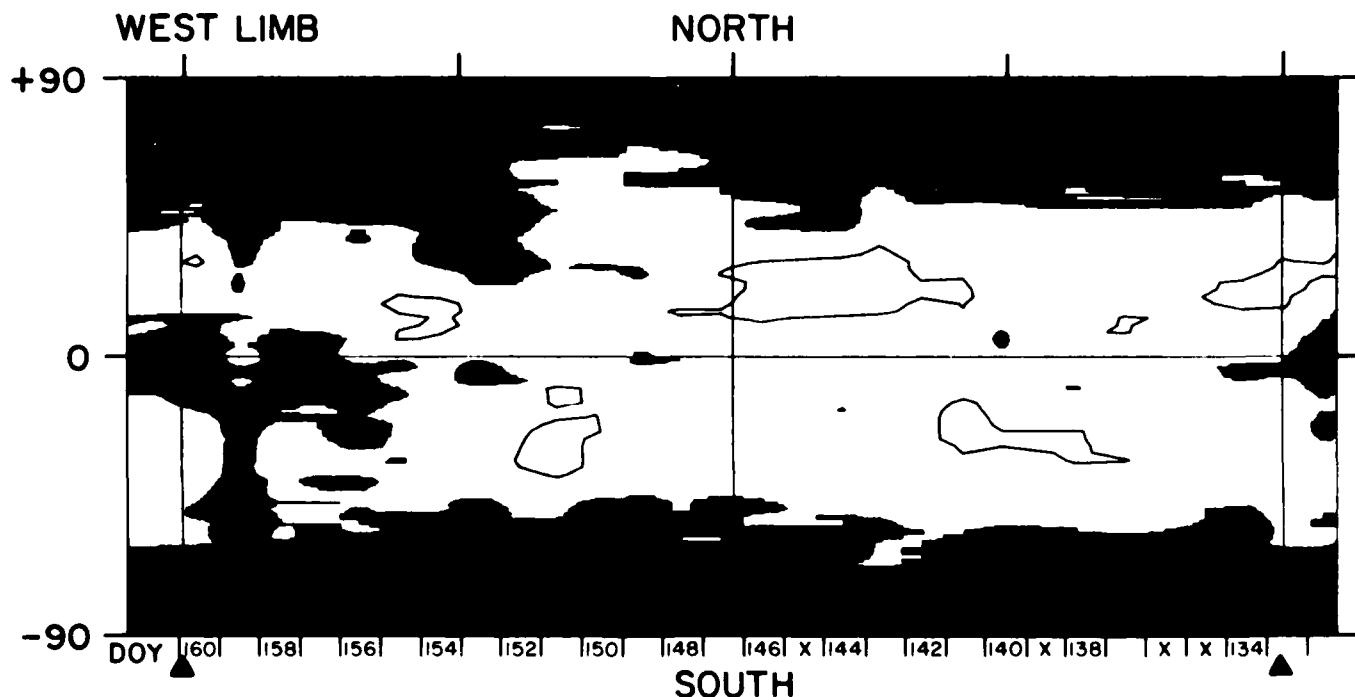
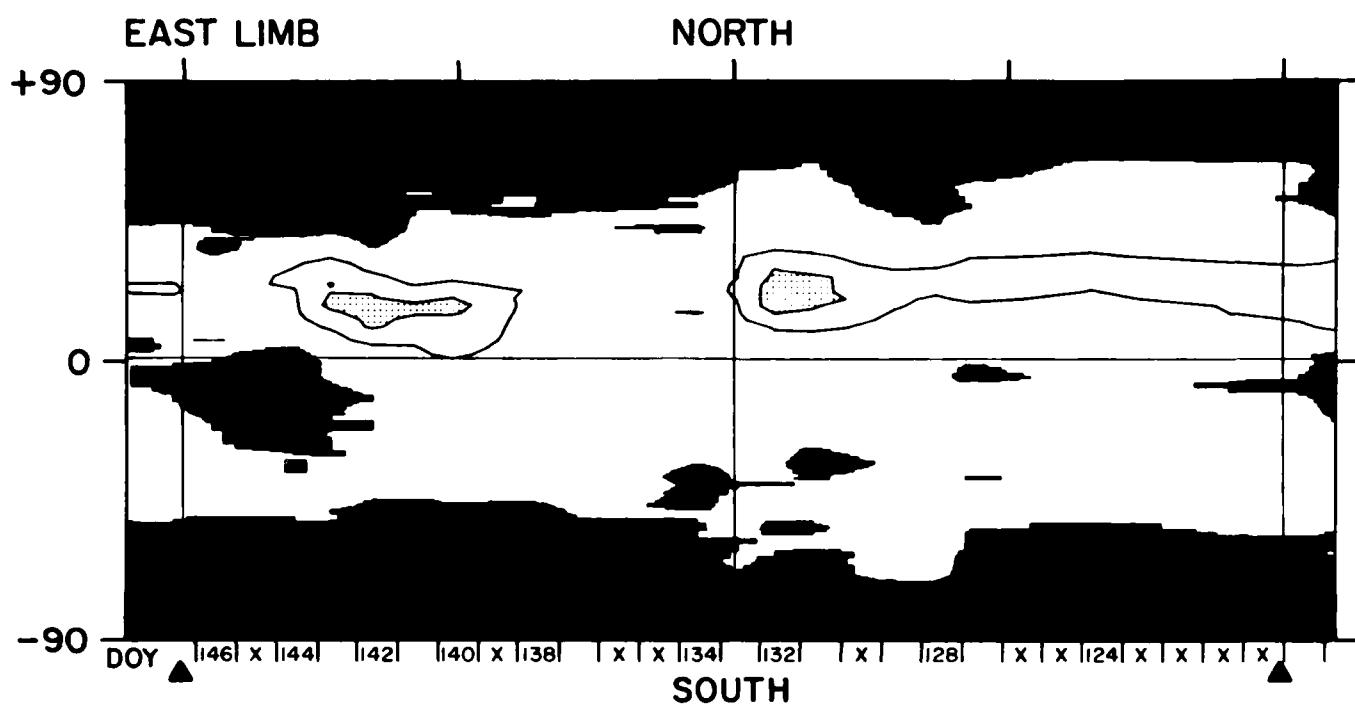
0 4 8 12 16 20 24 28 MIL

X = NO DATA

NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1668 HEIGHT 1.15 R<sub>o</sub> YEAR 1978

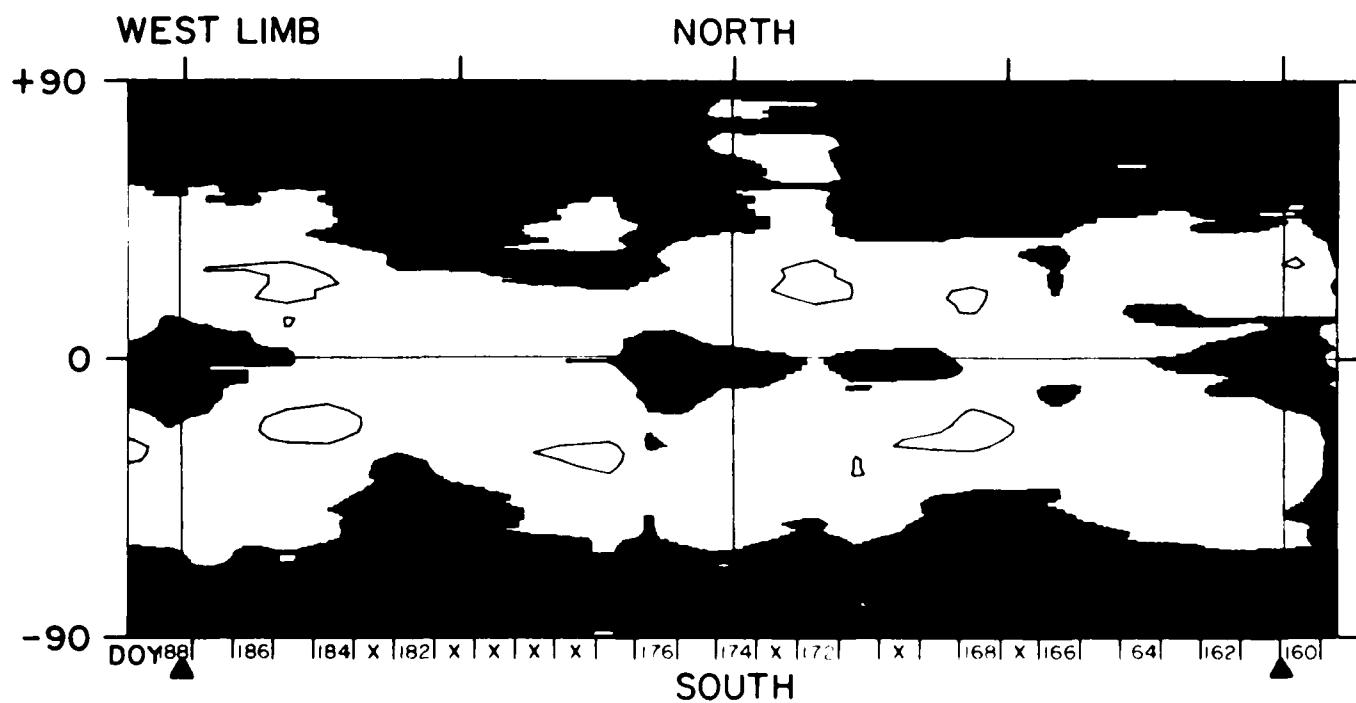
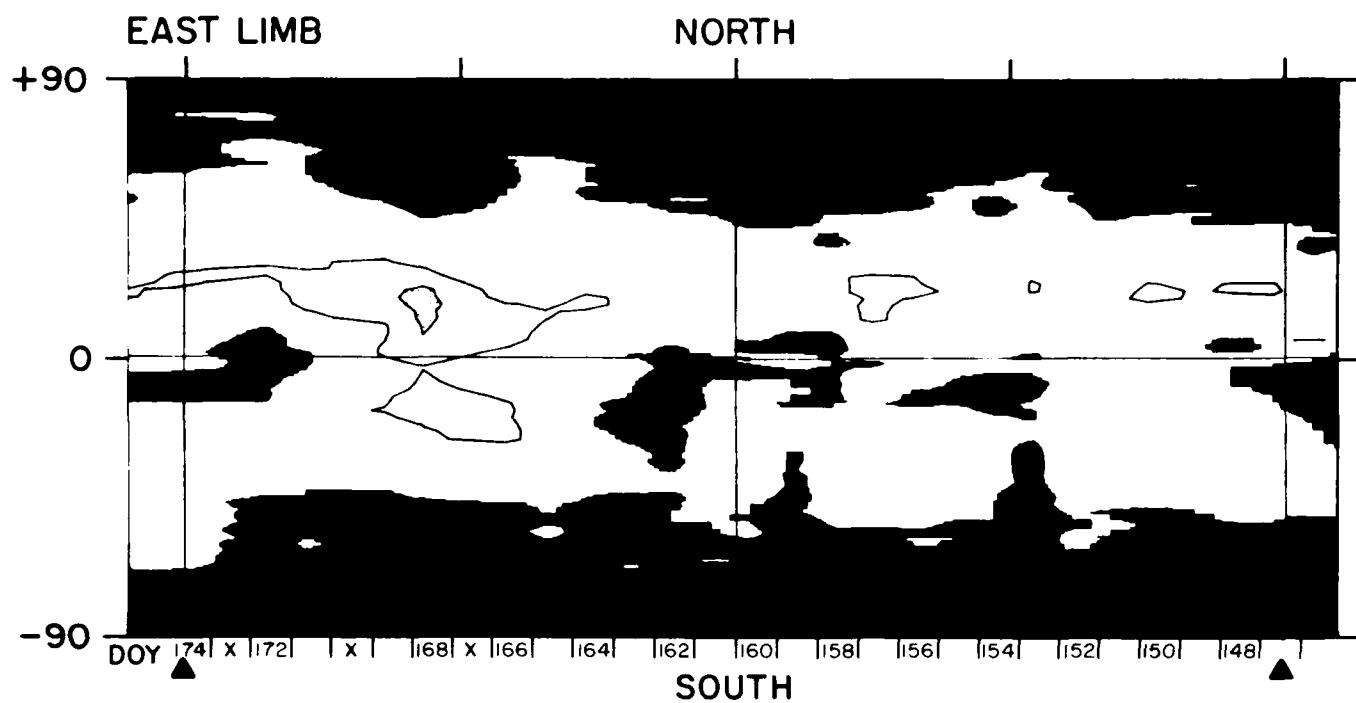


X = NO DATA

# NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

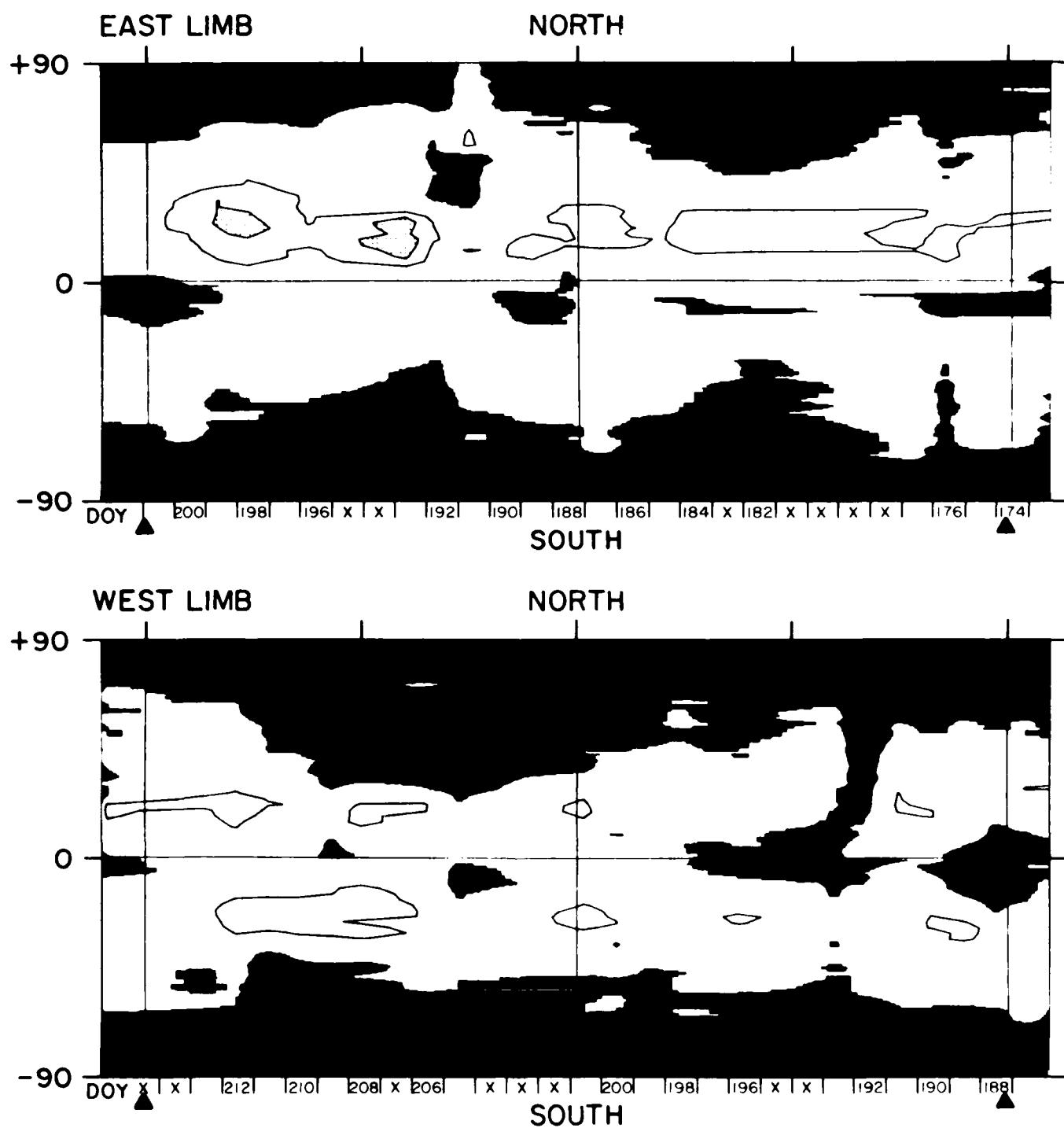
Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1669 HEIGHT 1.15 R<sub>o</sub> YEAR 1978



0 4 8 12 16 20 24 28 MIL

X = NO DATA

**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK****Fe XIV, 5303 Å CORONAL PHOTOMETER****ROTATION 1670 HEIGHT 1.15R<sub>o</sub> YEAR 1978**

X = NO DATA

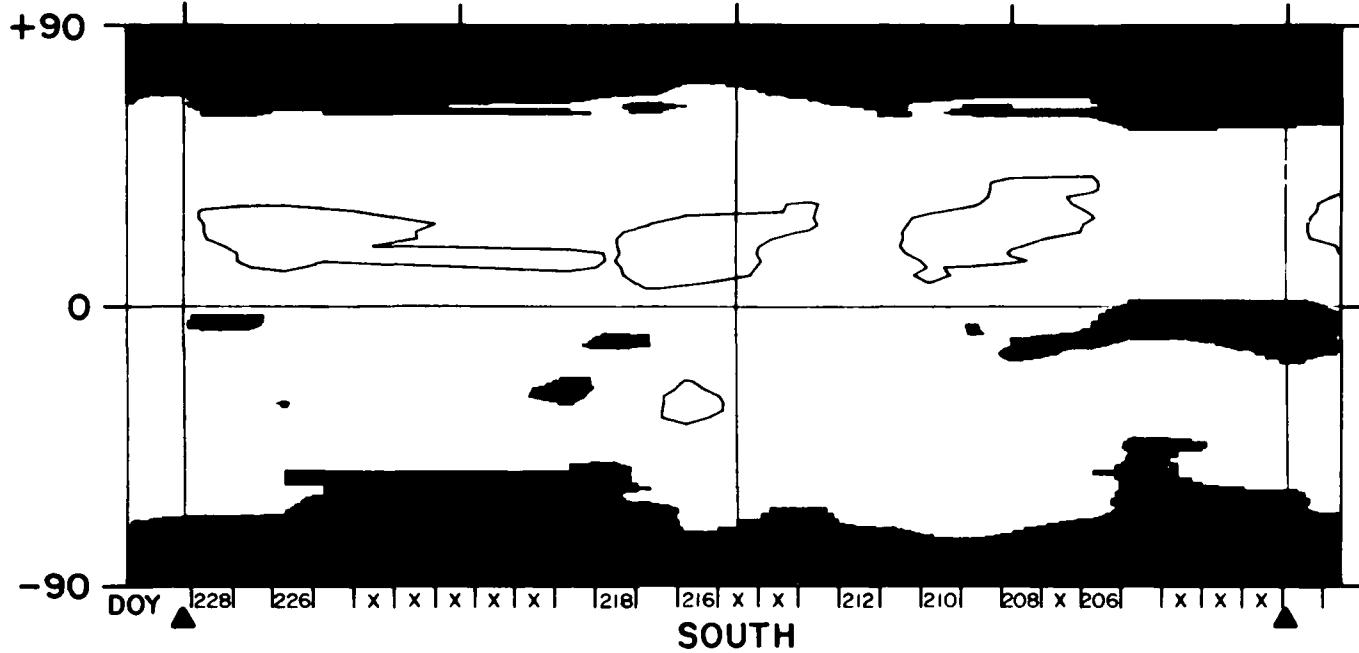
NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1671 HEIGHT 1.15 R<sub>o</sub> YEAR 1978

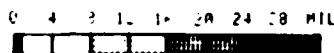
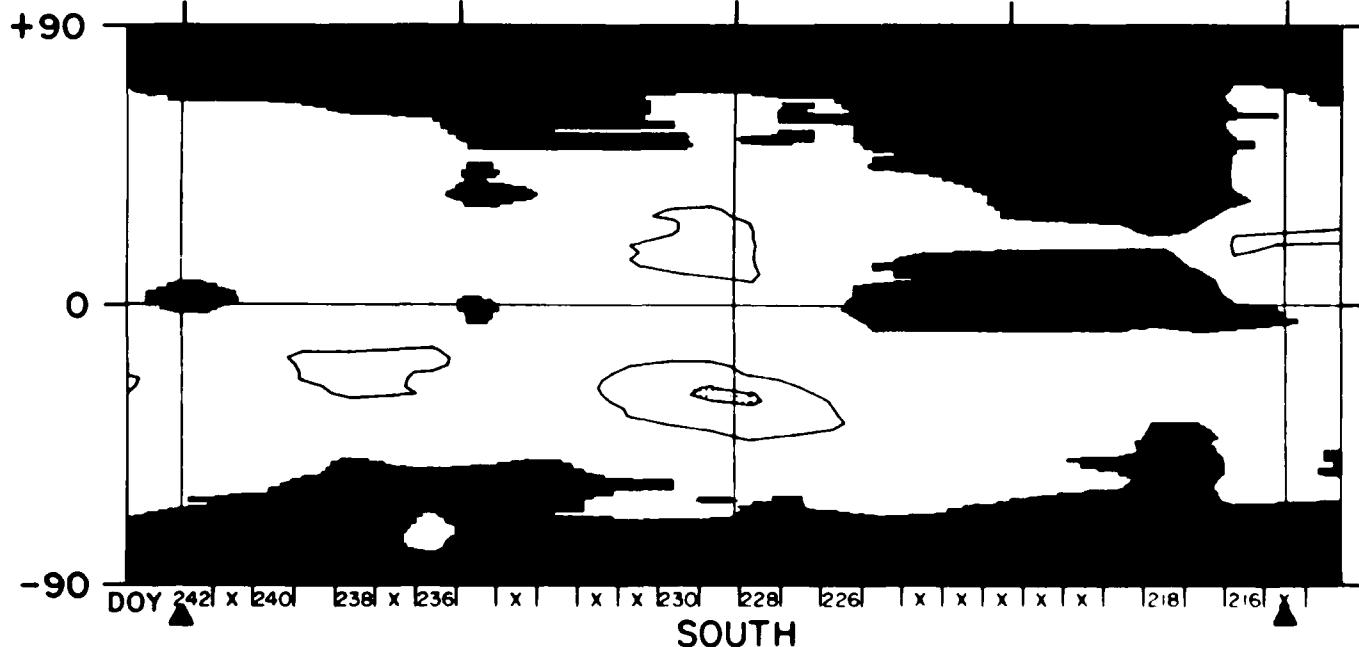
EAST LIMB

NORTH



WEST LIMB

NORTH

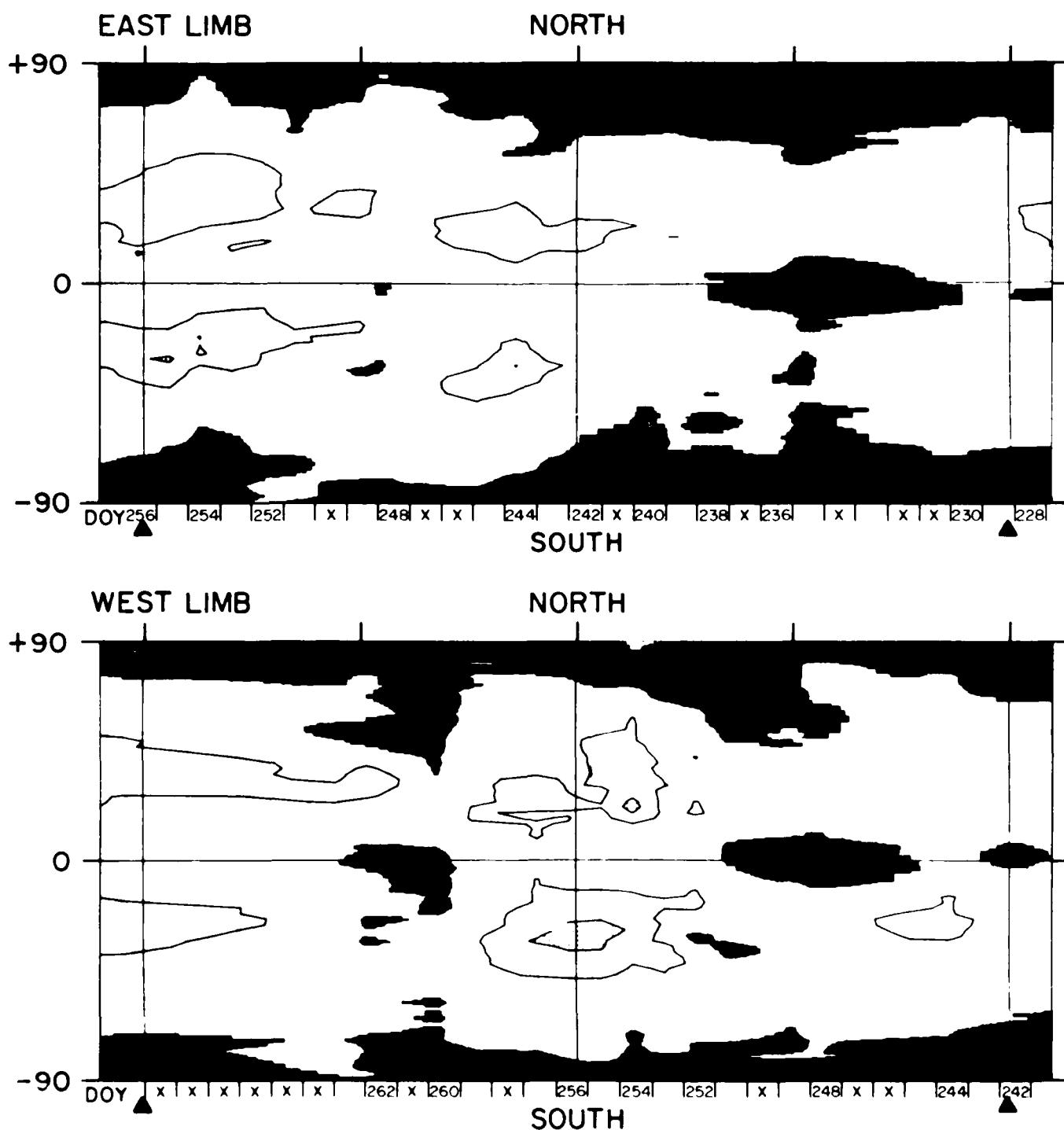


X = NO DATA

NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1672 HEIGHT 1.15 R<sub>o</sub> YEAR 1978

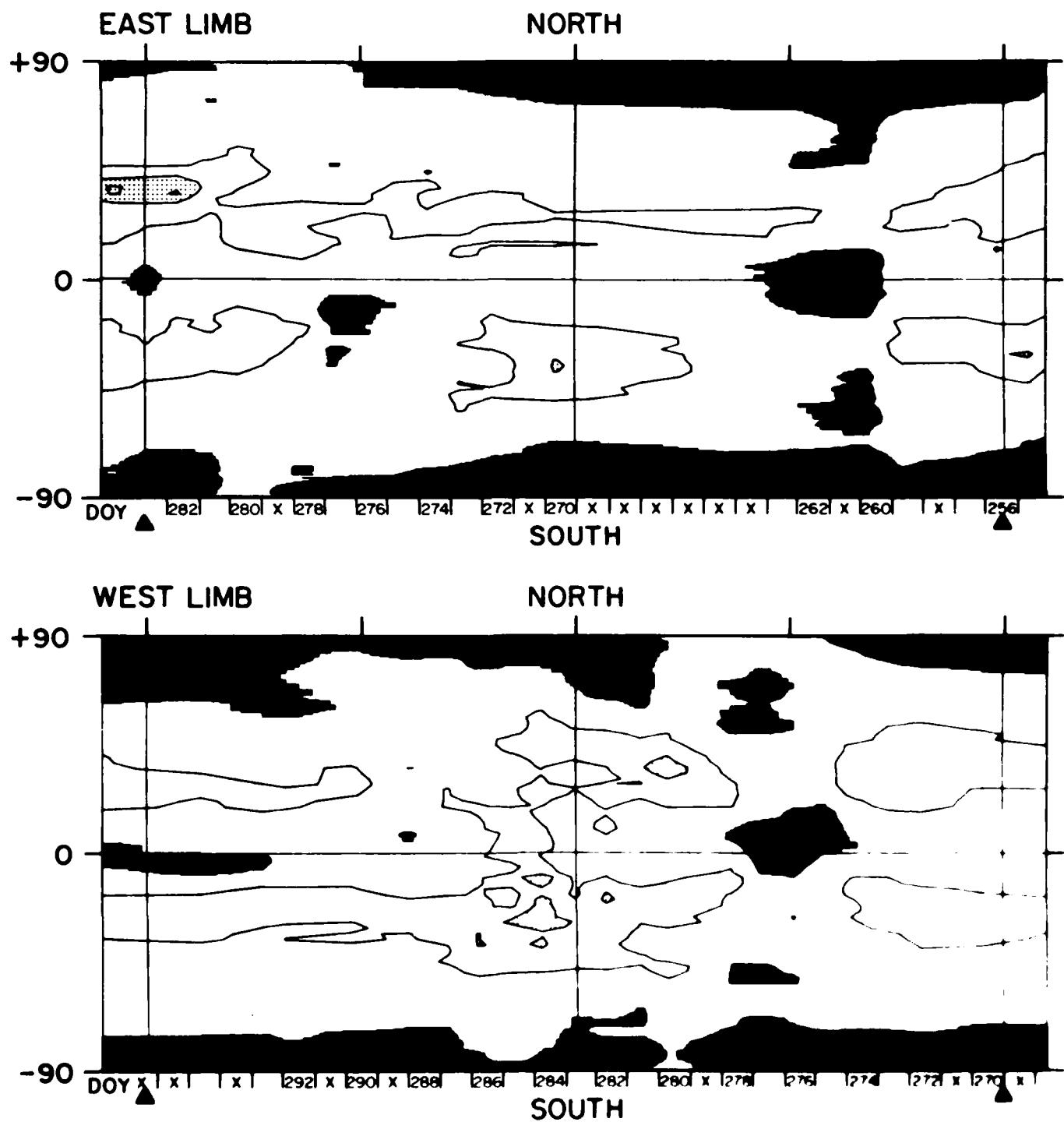


X = NO DATA

NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1673 HEIGHT 1.15 R<sub>o</sub> YEAR 1978

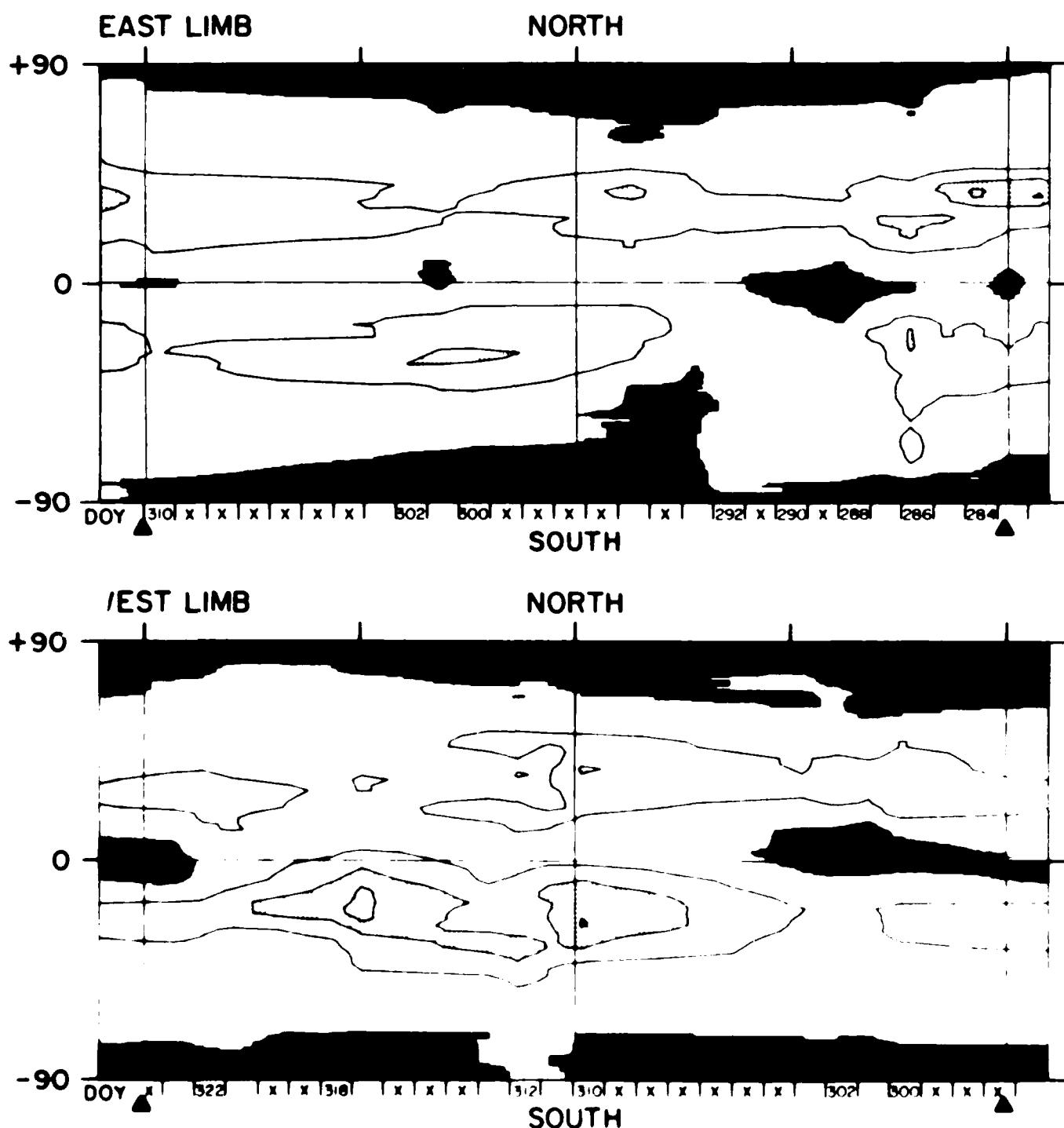


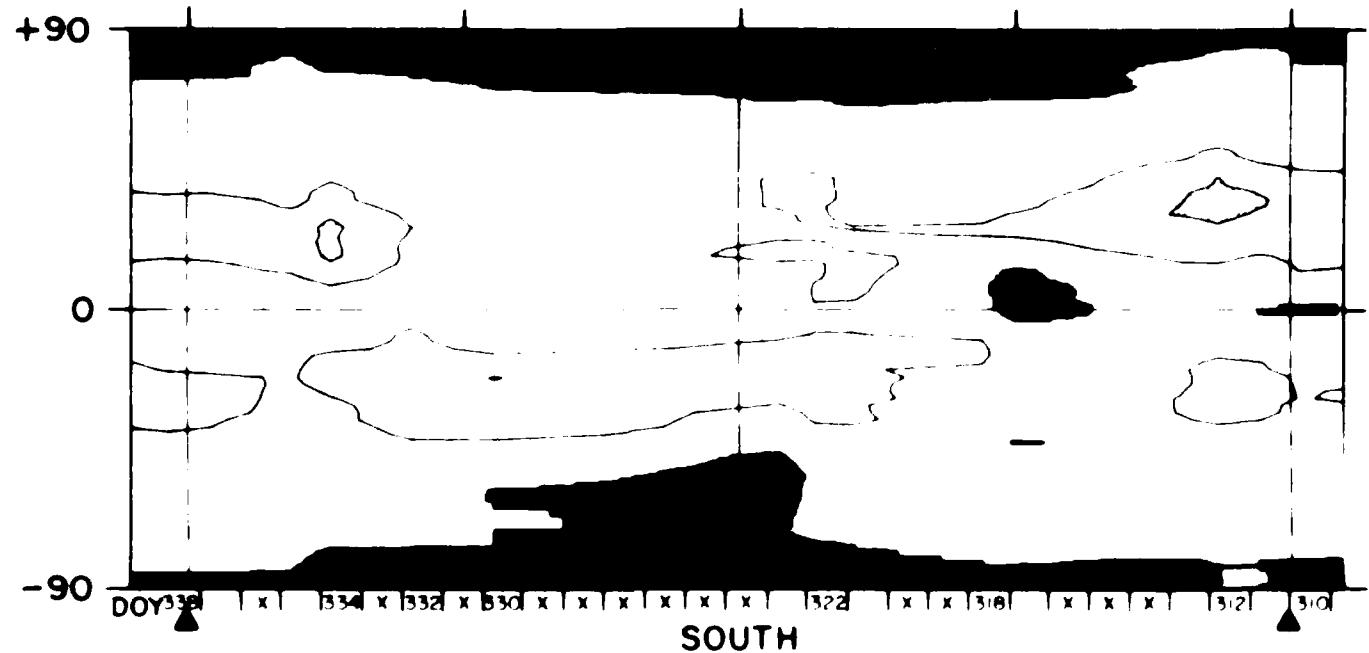
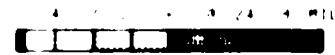
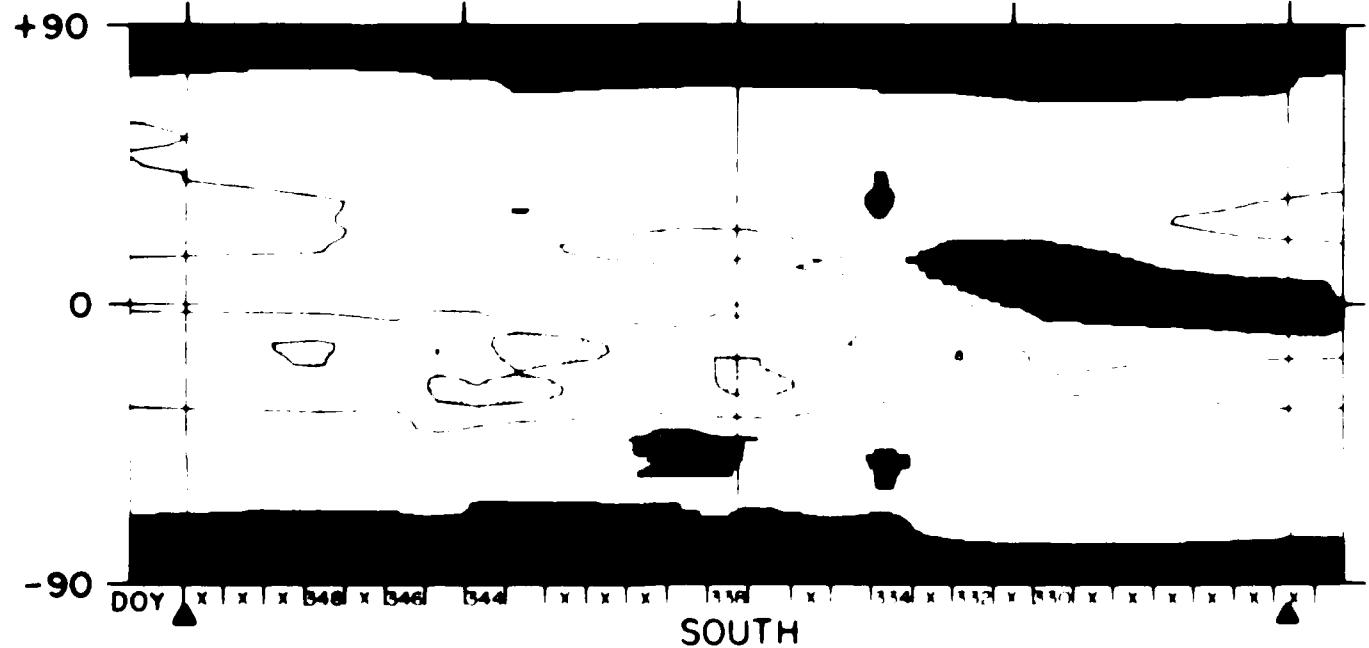
X = NO DATA

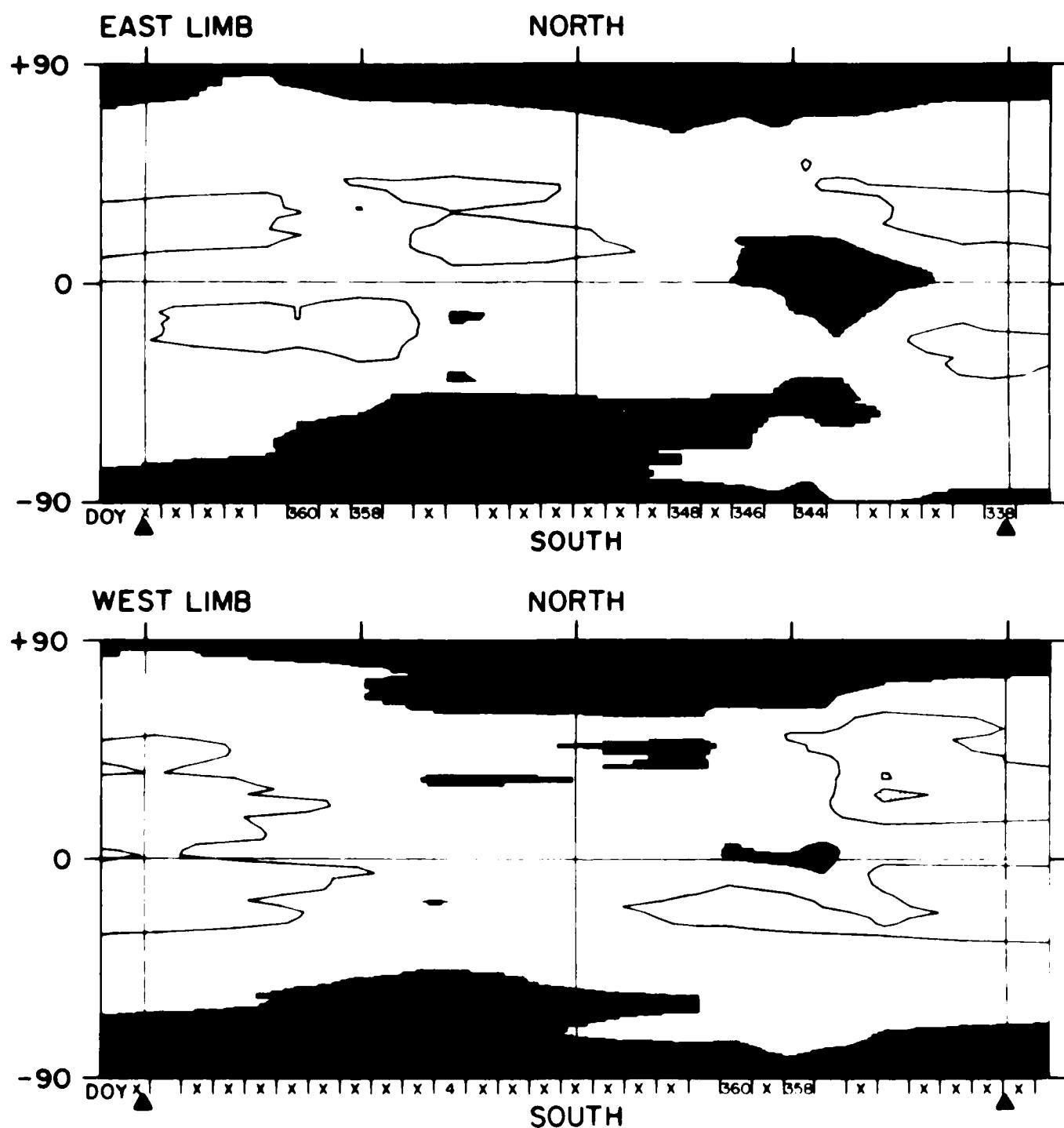
NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

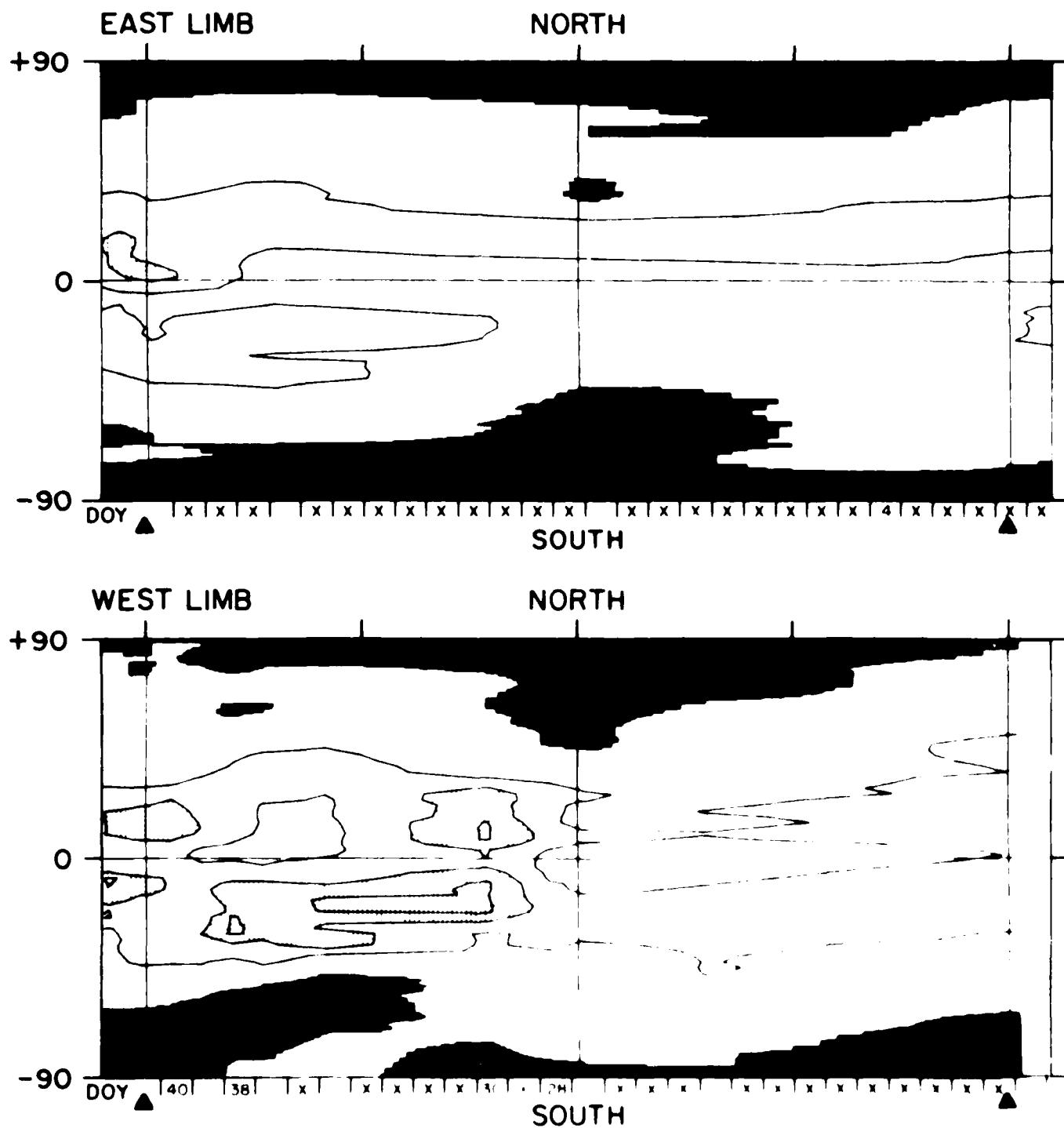
Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1674 HEIGHT 1.15R. YEAR 1978

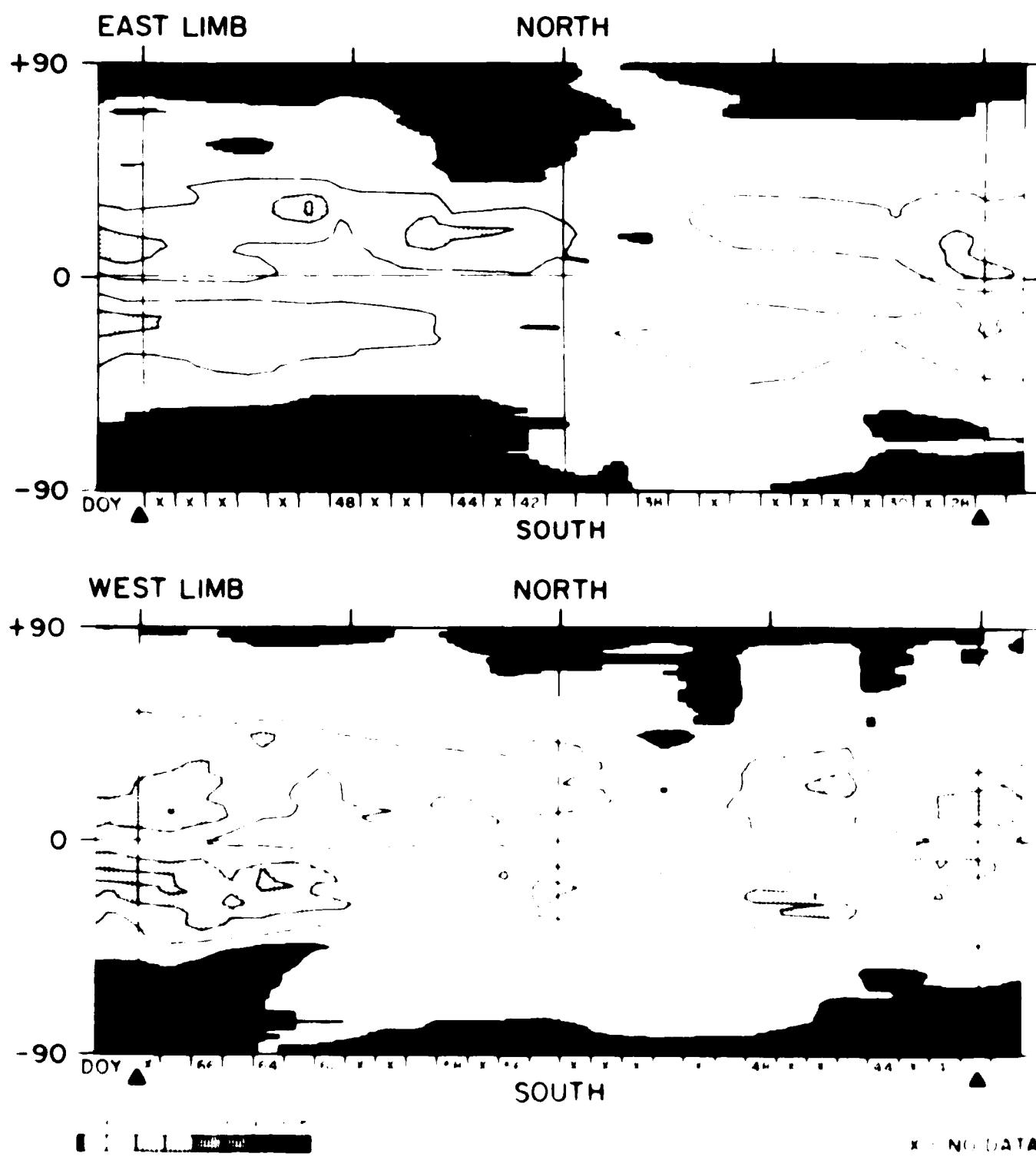


**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK****Fe XIV, 5303 Å CORONAL PHOTOMETER****ROTATION 1675 HEIGHT 1.15 R<sub>sun</sub> YEAR 1978****EAST LIMB****NORTH****WEST LIMB****NORTH****X = NO DATA**

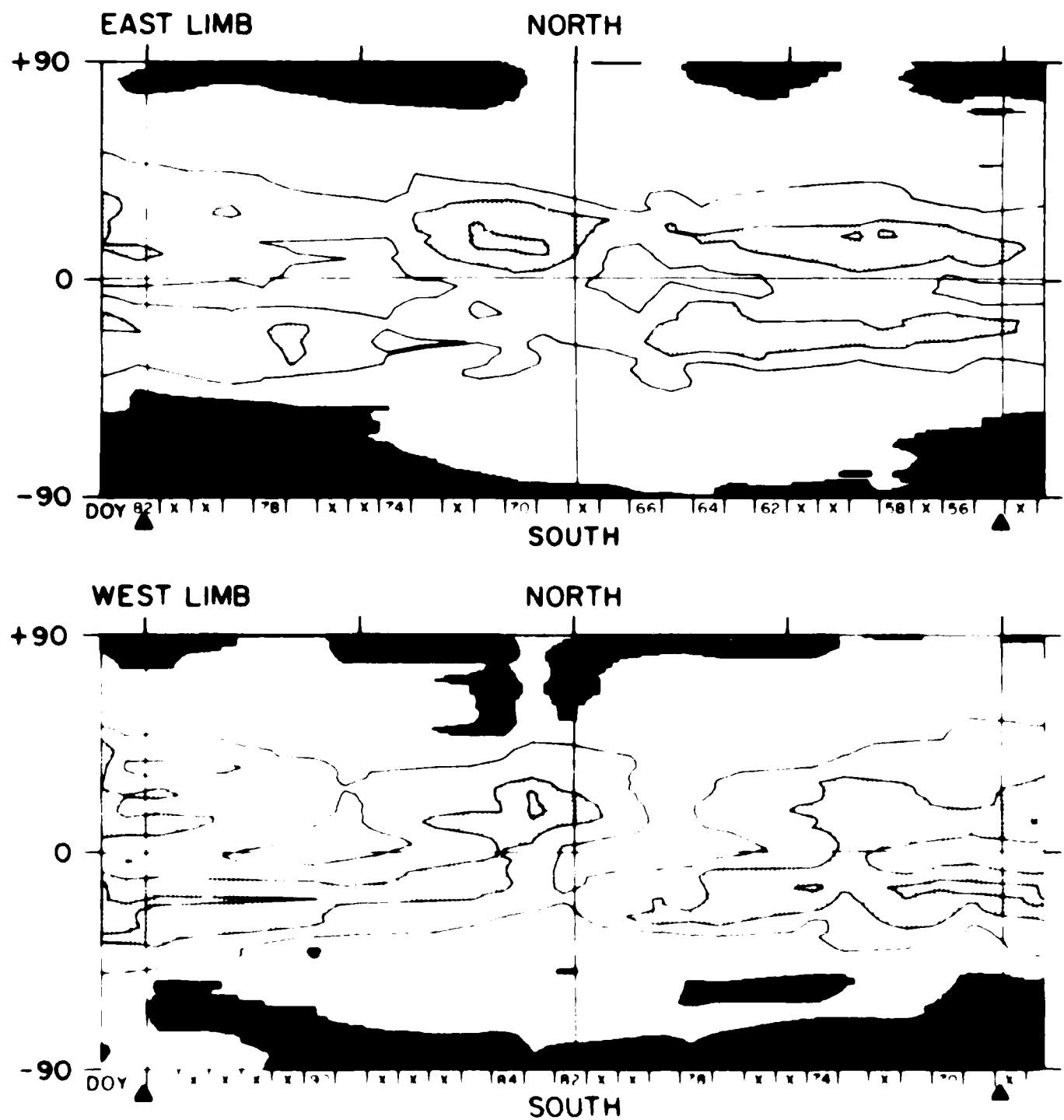
**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK****Fe XIV, 5303 Å CORONAL PHOTOMETER****ROTATION 1676 HEIGHT 1.15 R<sub>o</sub> YEAR 1978****X = NO DATA**

**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK****Fe XIV, 5303 Å CORONAL PHOTOMETER****ROTATION 1677 HEIGHT 1.15 R<sub>⊕</sub> YEAR 1979**

X = NO DATA

**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK****Fe XIV, 5303 Å CORONAL PHOTOMETER****ROTATION 1678 HEIGHT 1.15R. YEAR 1979**

X = NO DATA

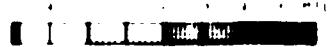
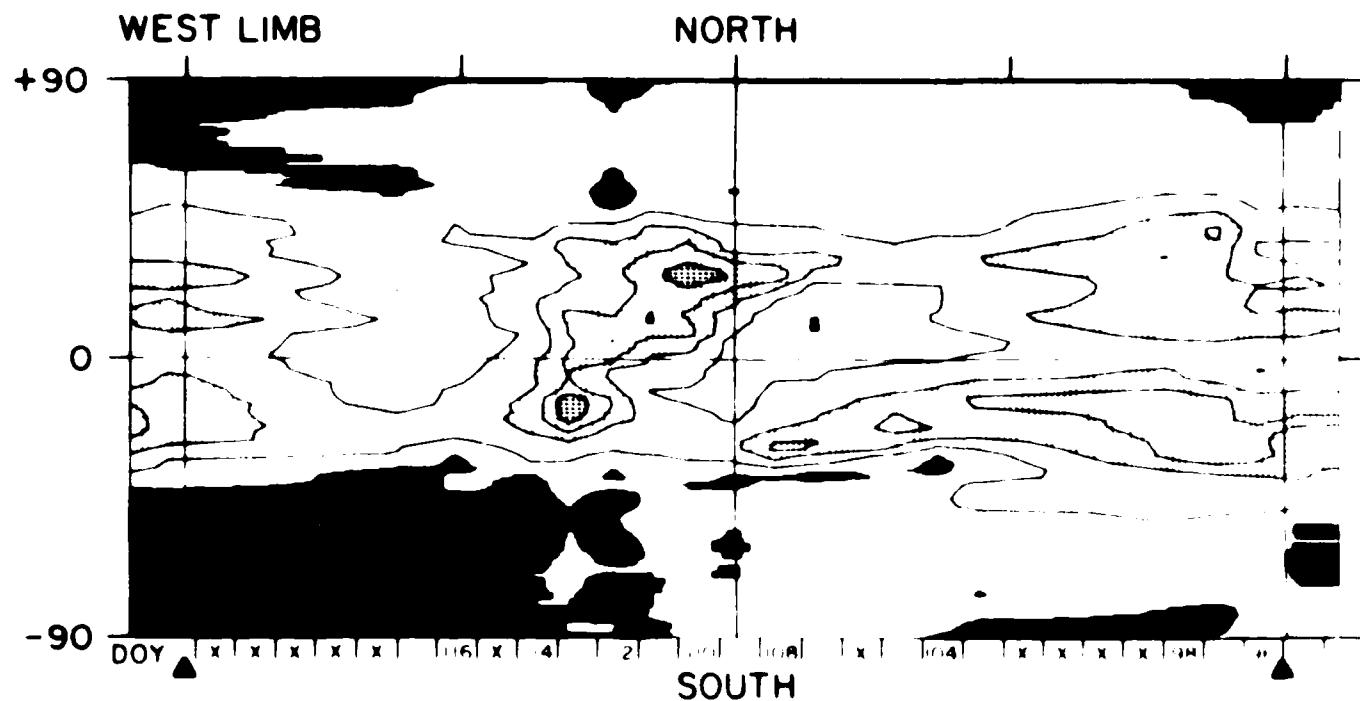
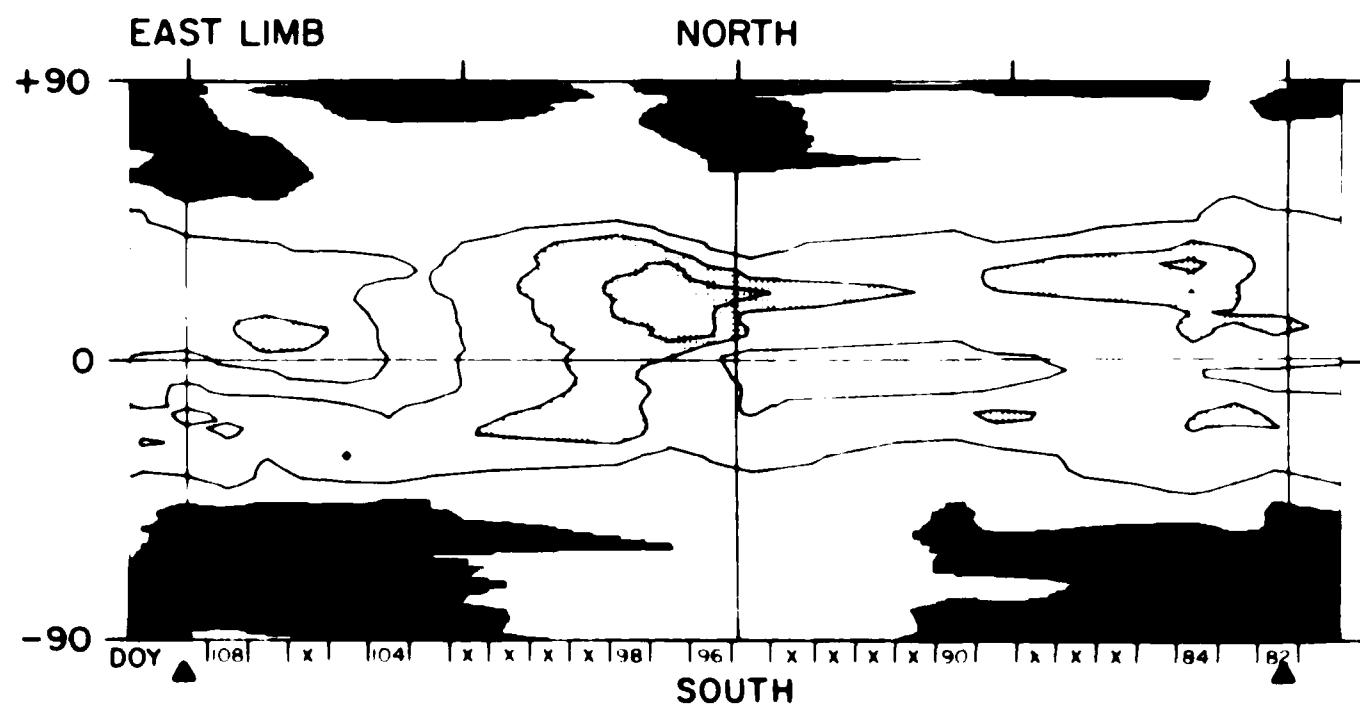
**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK****Fe XIV, 5303 Å CORONAL PHOTOMETER****ROTATION 1679 HEIGHT 1.15R. YEAR 1979**

X = NO DATA

# NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1680 HEIGHT 1.15 R<sub>•</sub> YEAR 1979



X = NO DATA

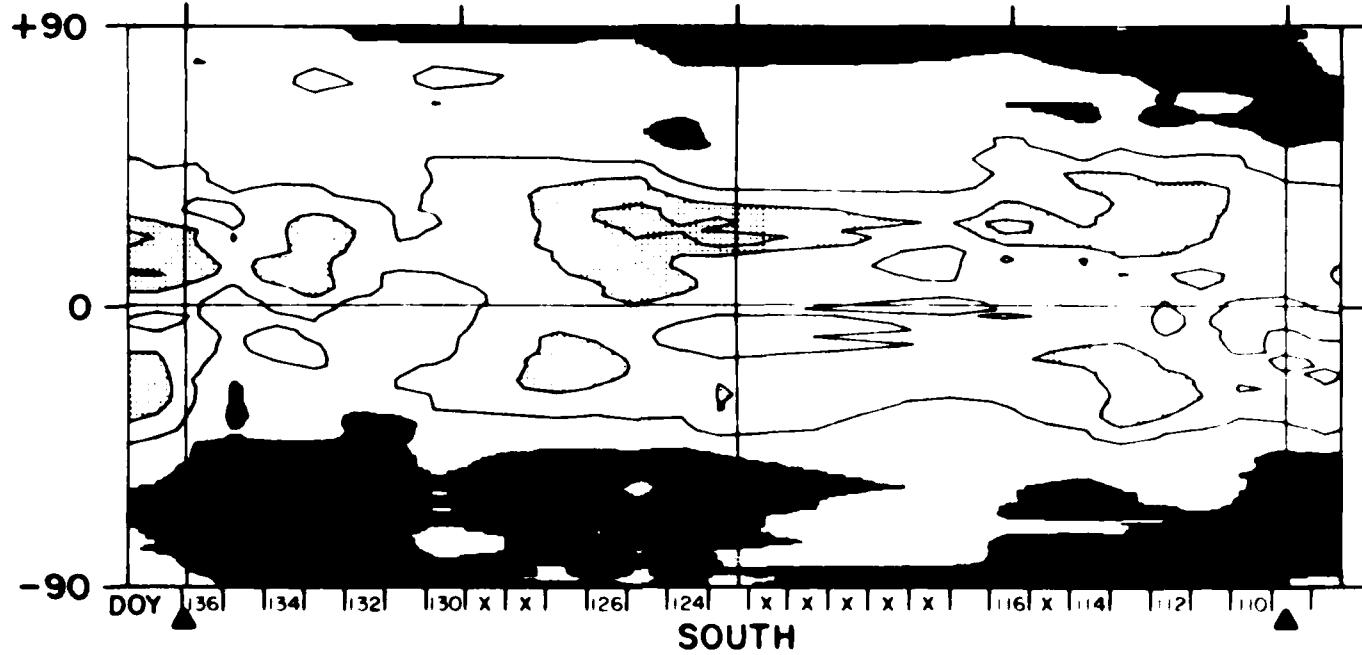
**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK**

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1681 HEIGHT 1.15 R<sub>o</sub> YEAR 1979

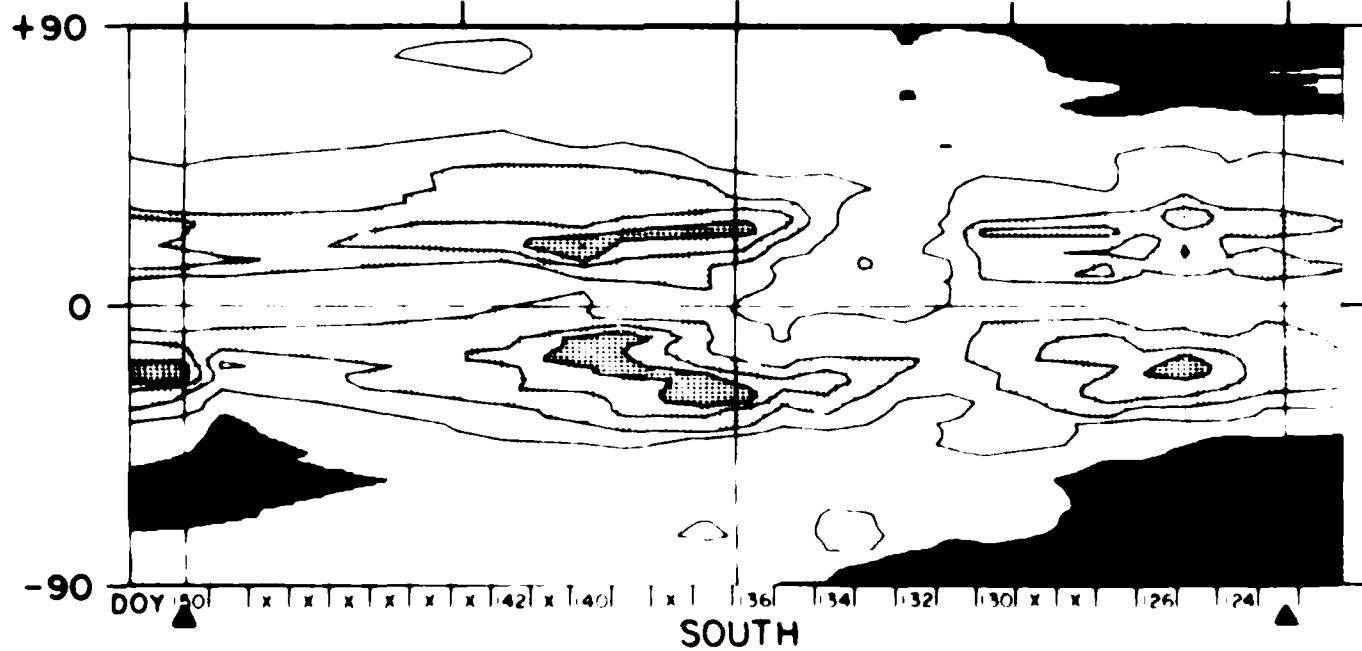
EAST LIMB

NORTH



WEST LIMB

NORTH



X = NO DATA

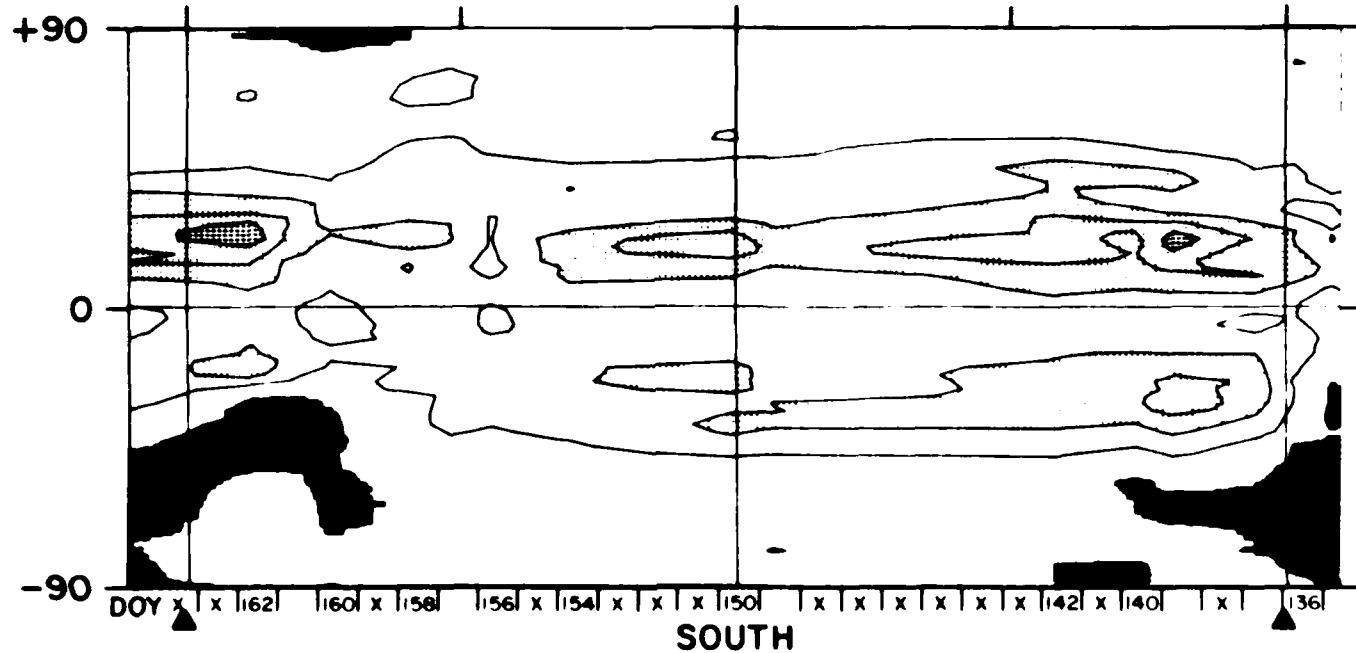
NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1682 HEIGHT 1.15 R<sub>•</sub> YEAR 1979

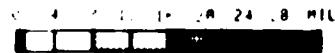
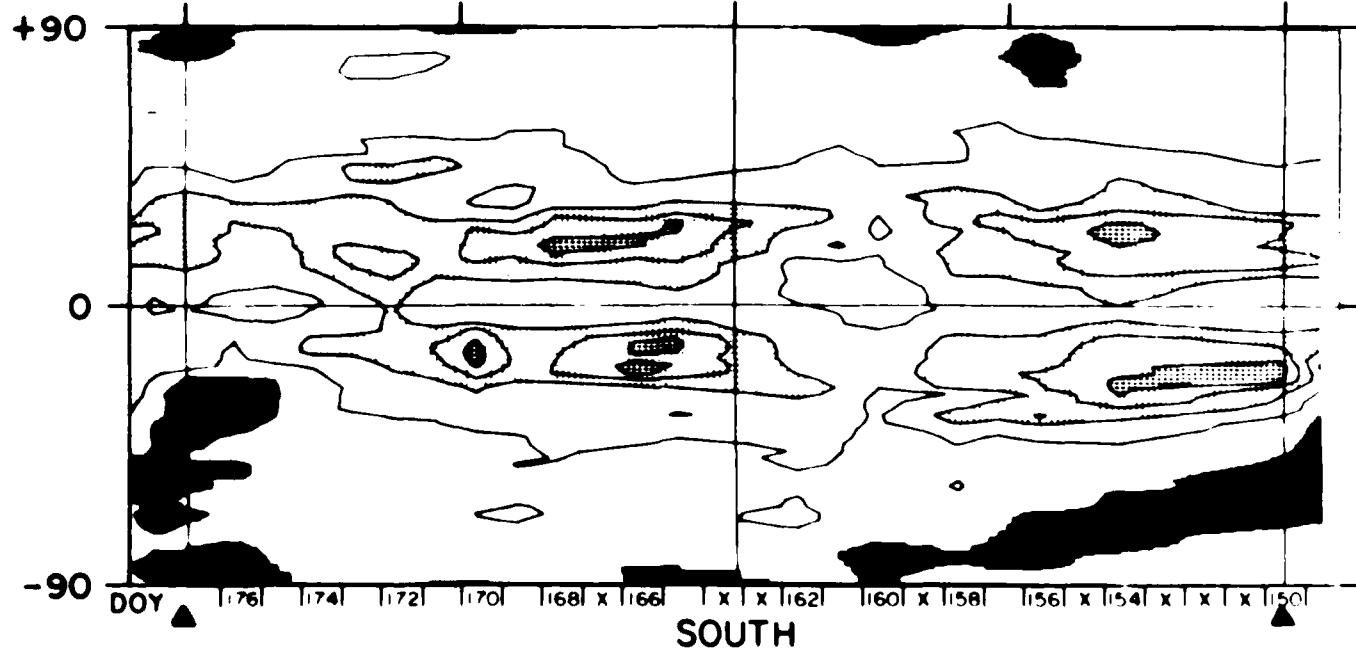
EAST LIMB

NORTH

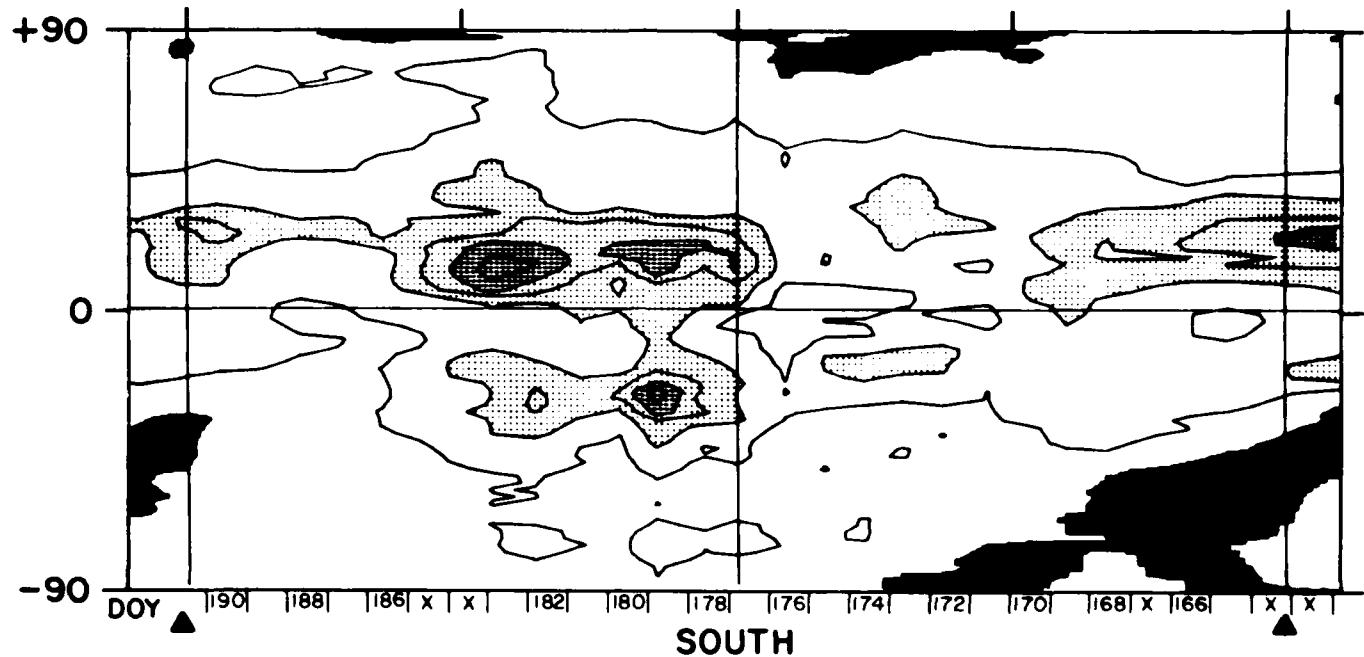
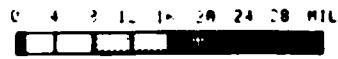
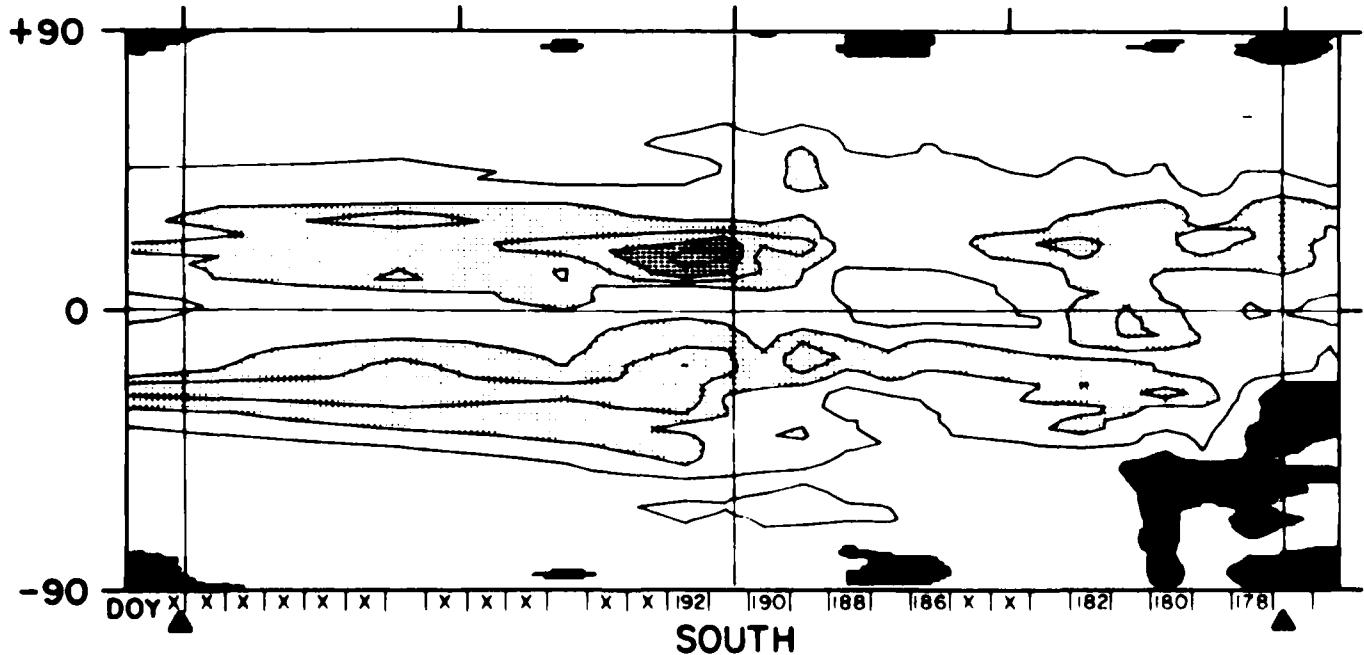


WEST LIMB

NORTH



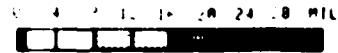
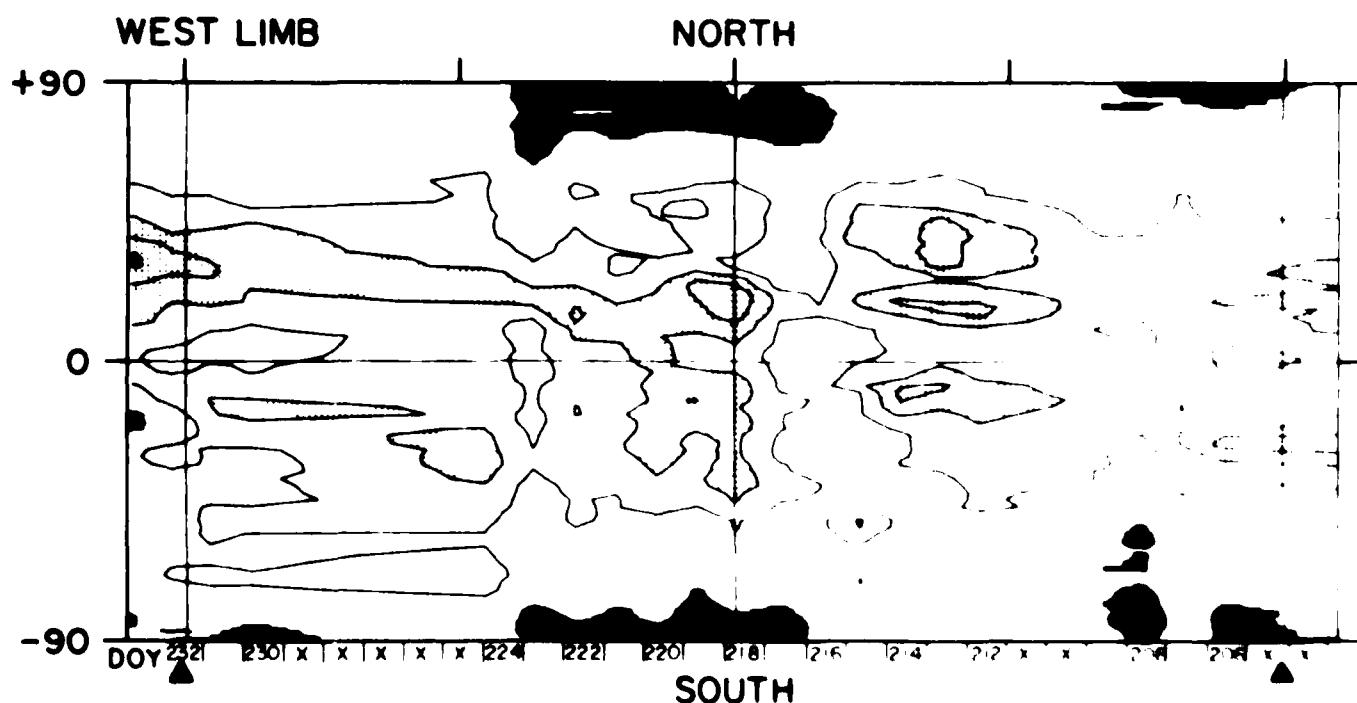
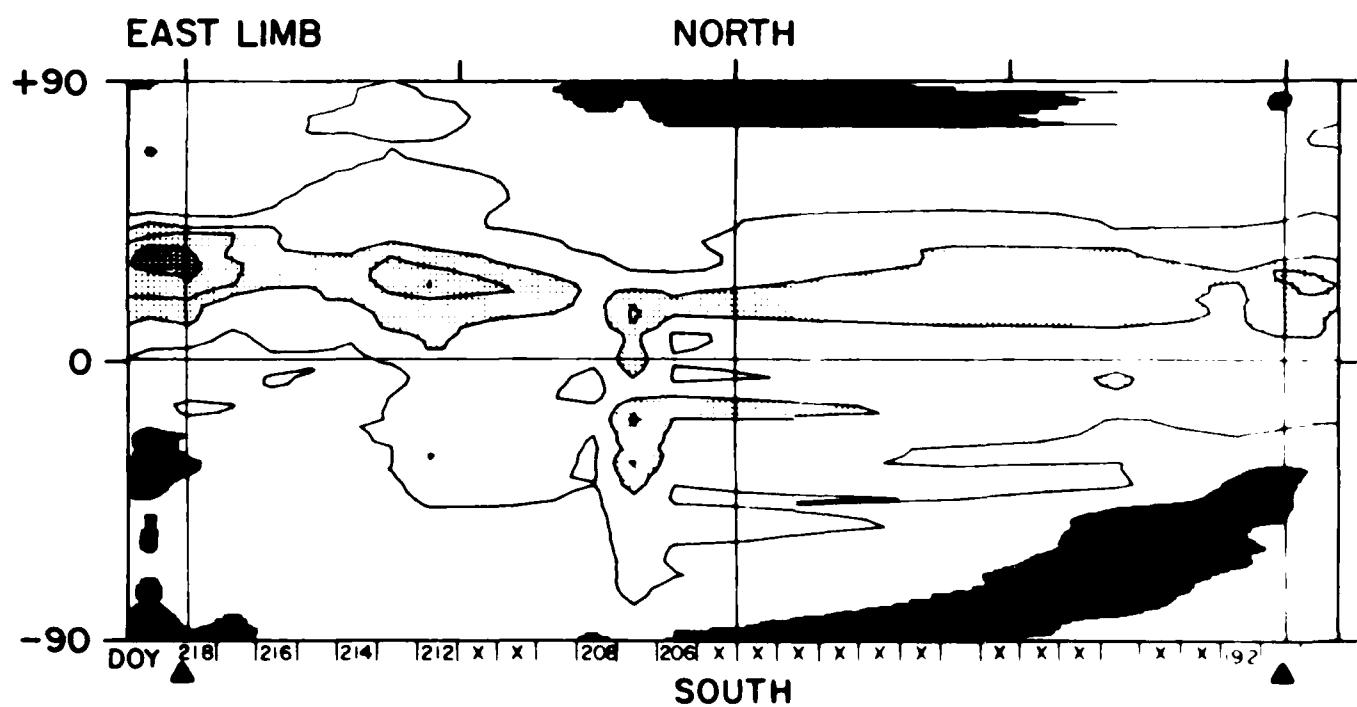
X = NO DATA

**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK****Fe XIV, 5303 Å CORONAL PHOTOMETER****ROTATION 1683 HEIGHT 1.15 R<sub>o</sub> YEAR 1979****EAST LIMB****NORTH****WEST LIMB****NORTH****X = NO DATA**

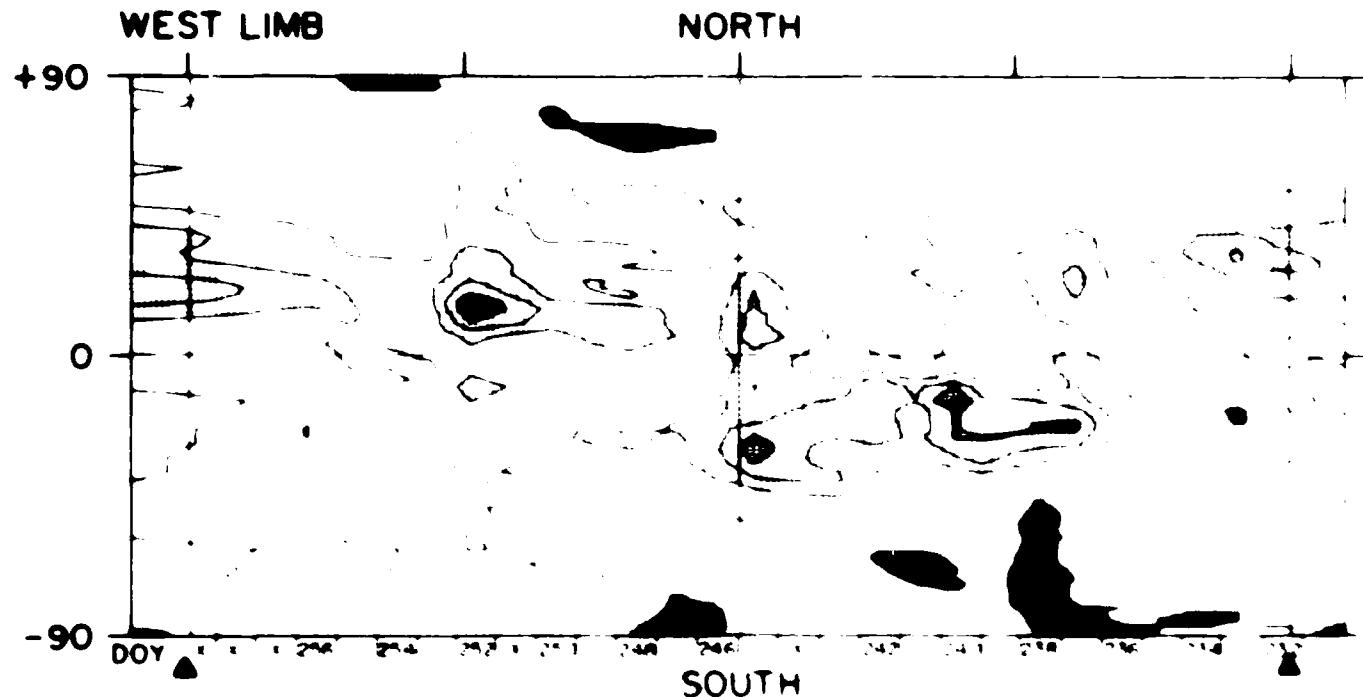
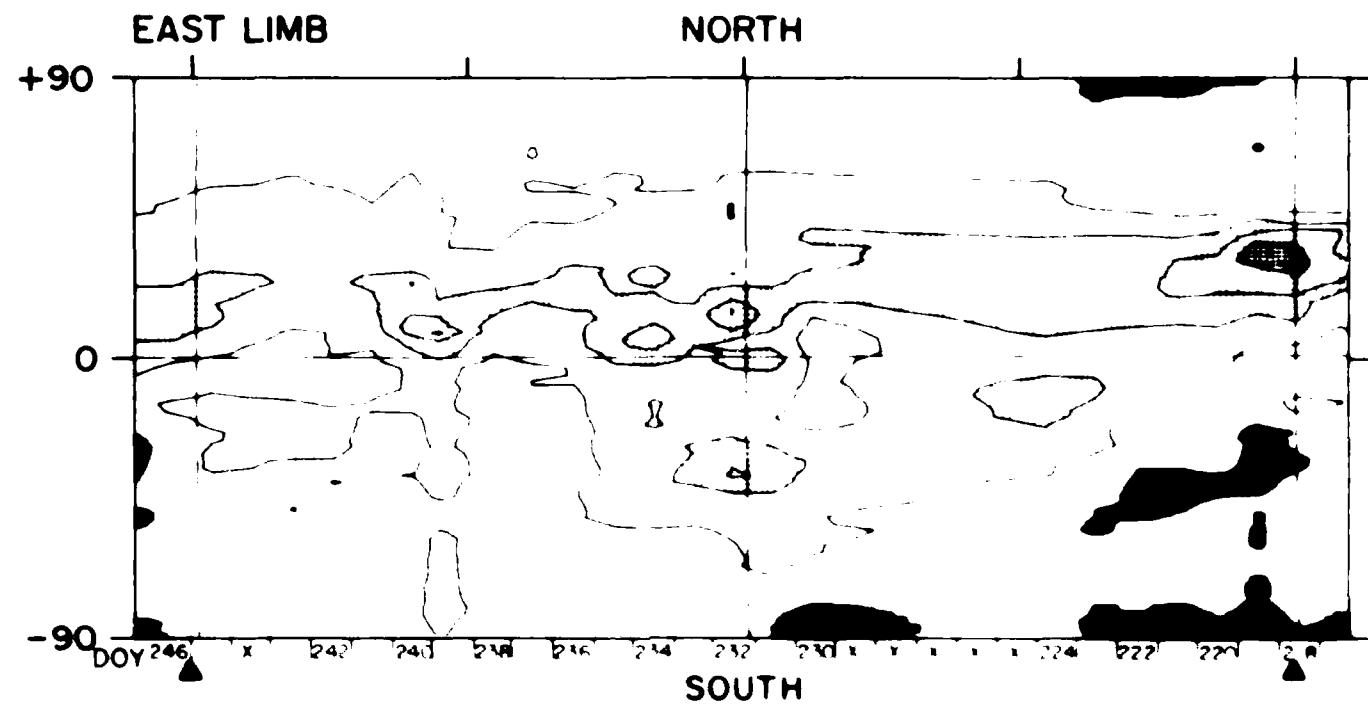
NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

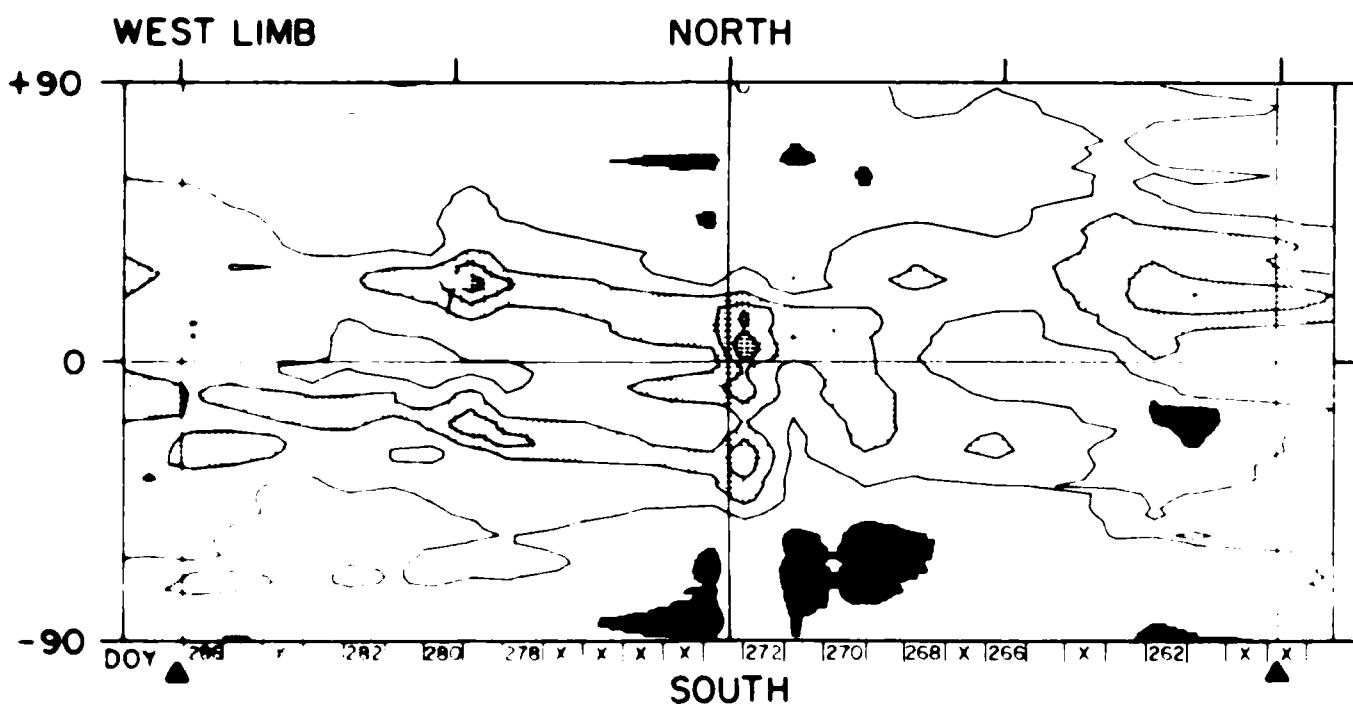
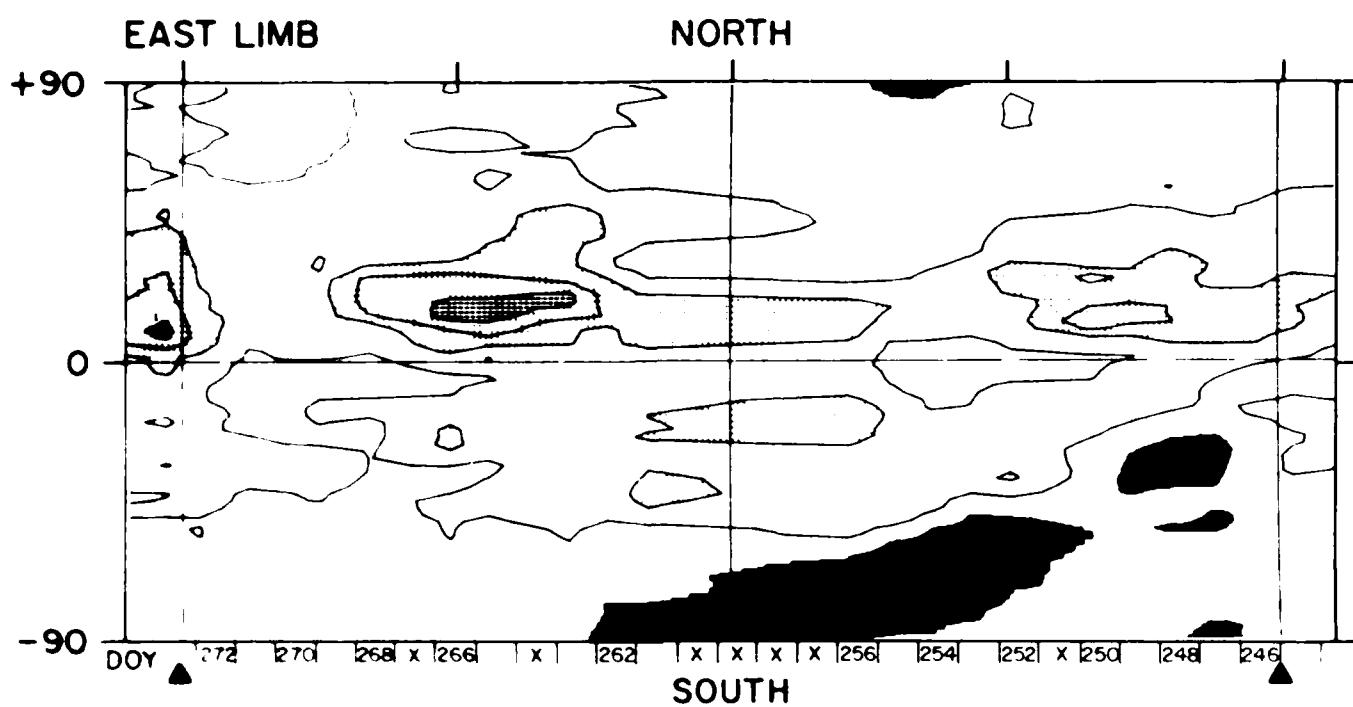
Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1684 HEIGHT 1.15R<sub>o</sub> YEAR 1979



X = NO DATA

**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK****Fe XIV, 5303 Å CORONAL PHOTOMETER****ROTATION 1685 HEIGHT 1.15 R<sub>sun</sub> YEAR 1979**1 R<sub>sun</sub> DATA

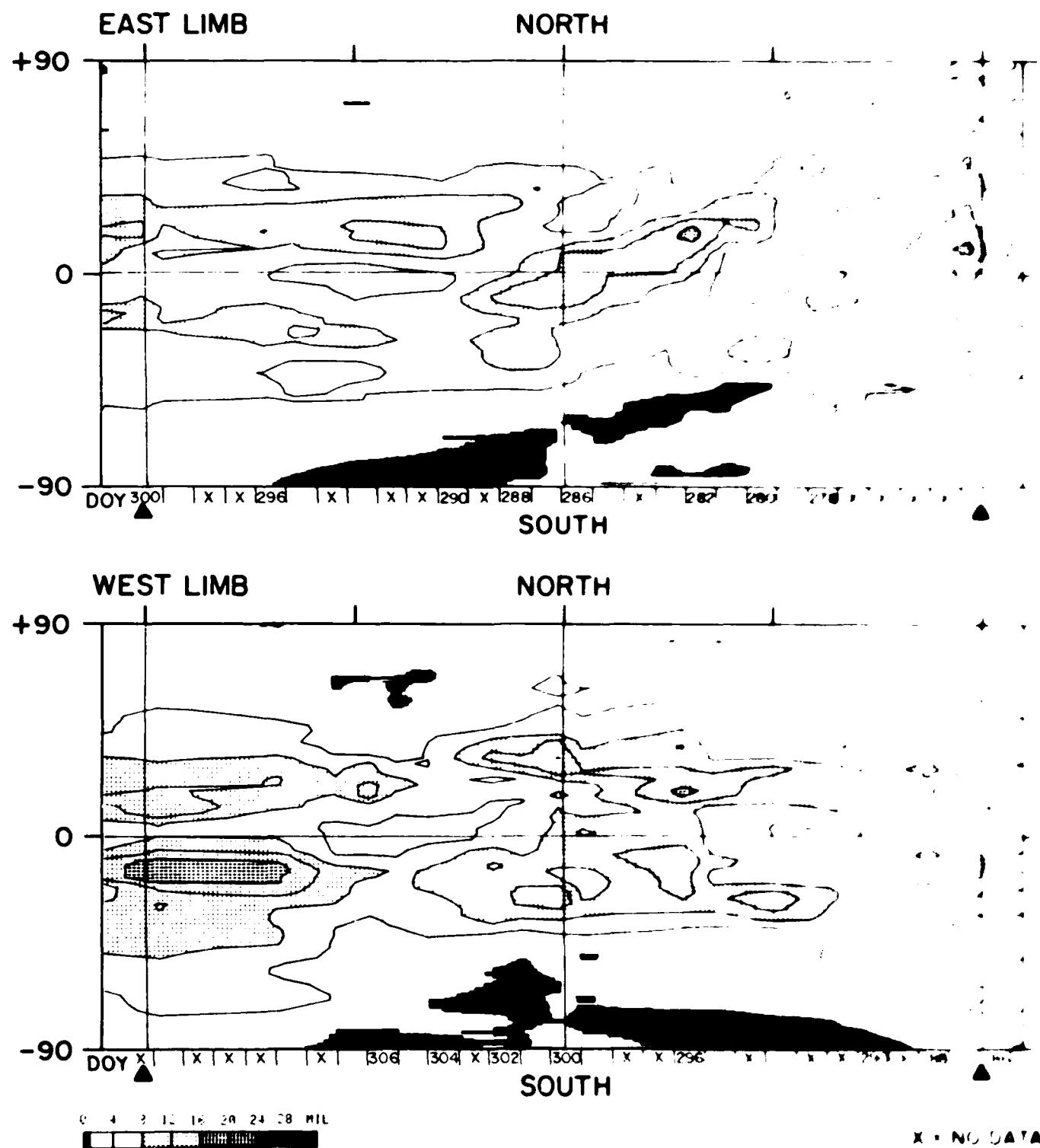
**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK****Fe XIV, 5303 Å CORONAL PHOTOMETER****ROTATION 1686 HEIGHT 1.15R<sub>o</sub> YEAR 1979**

X = NO DATA

**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK**

**Fe XIV, 5303 Å CORONAL PHOTOMETER**

**ROTATION 1687 HEIGHT 1.15 R<sub>sun</sub> YEAR 1979**



**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK****Fe XIV, 5303 Å CORONAL PHOTOMETER****ROTATION 1688 HEIGHT 115R. YEAR 1979****EAST LIMB****NORTH**

+90

**SOUTH****WEST LIMB****NORTH**

+90

**SOUTH**

X = NO DATA

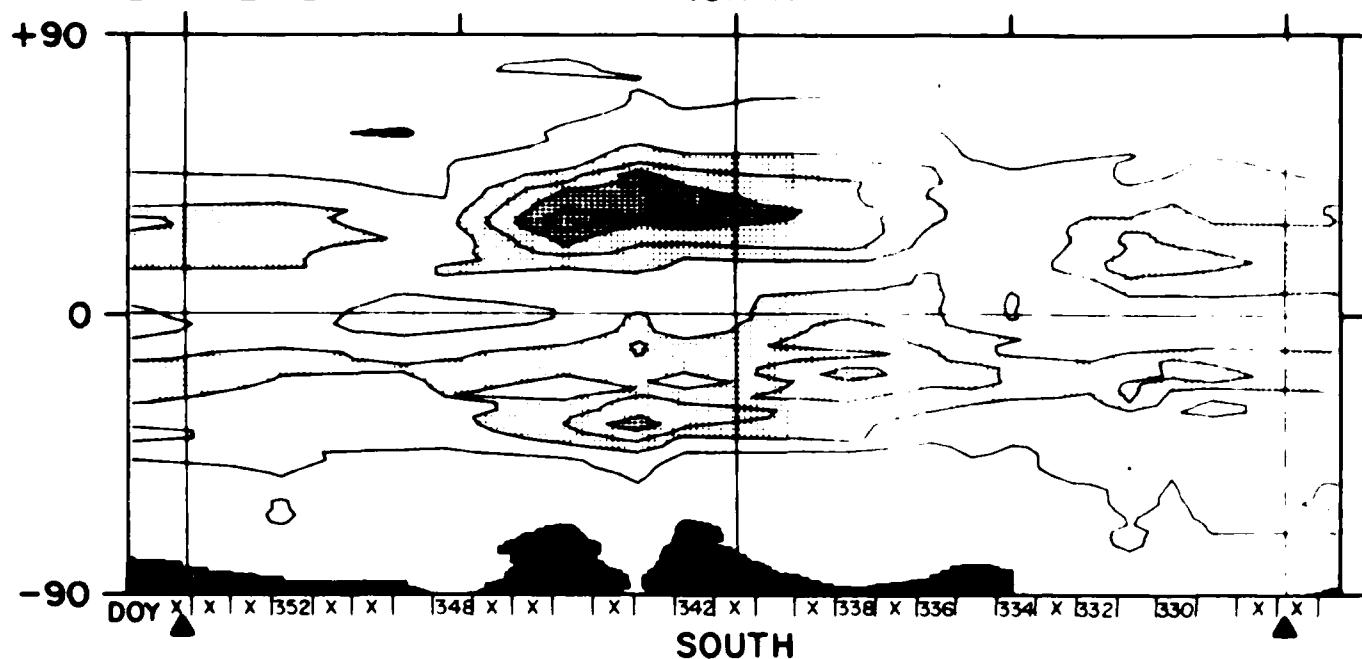
# NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1689 HEIGHT 1.15R<sub>•</sub> YEAR 1979

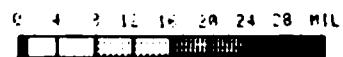
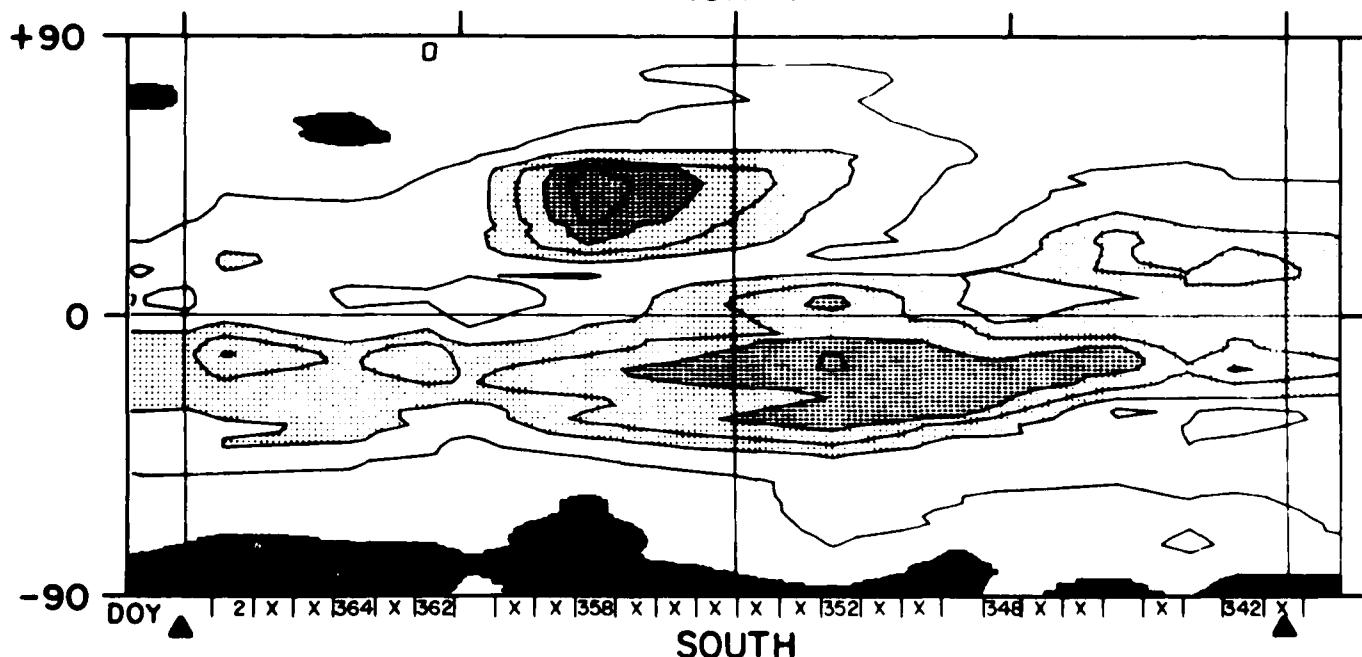
EAST LIMB

NORTH



WEST LIMB

NORTH

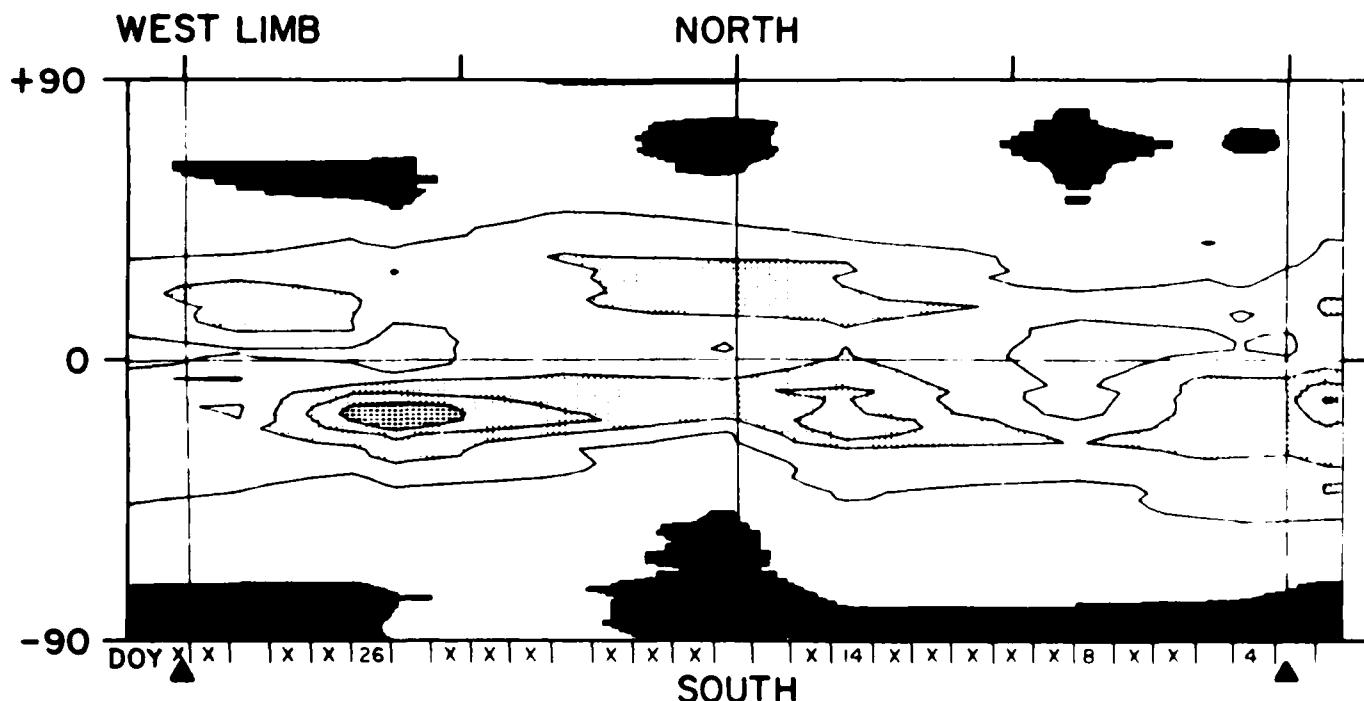
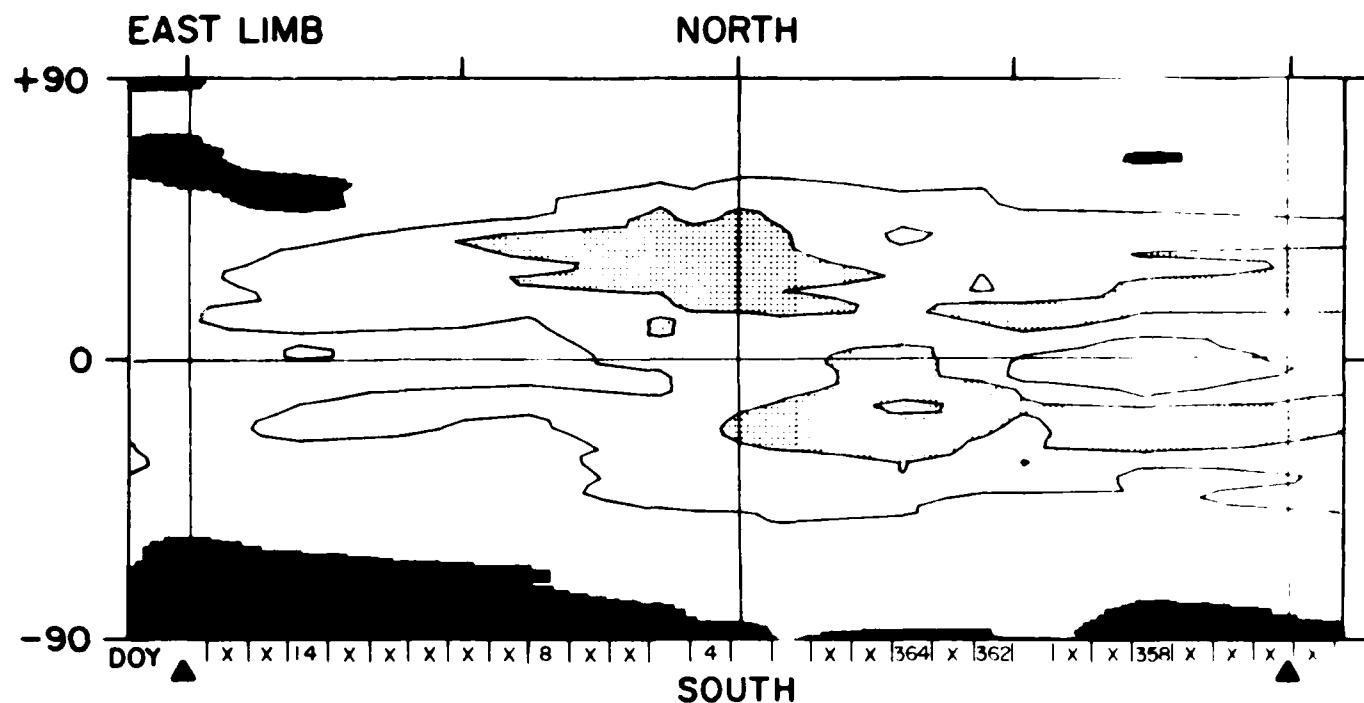


X = NO DATA

**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK**

**Fe XIV, 5303 Å CORONAL PHOTOMETER**

**ROTATION 1690 HEIGHT 1.15 R<sub>•</sub> YEAR 1980**

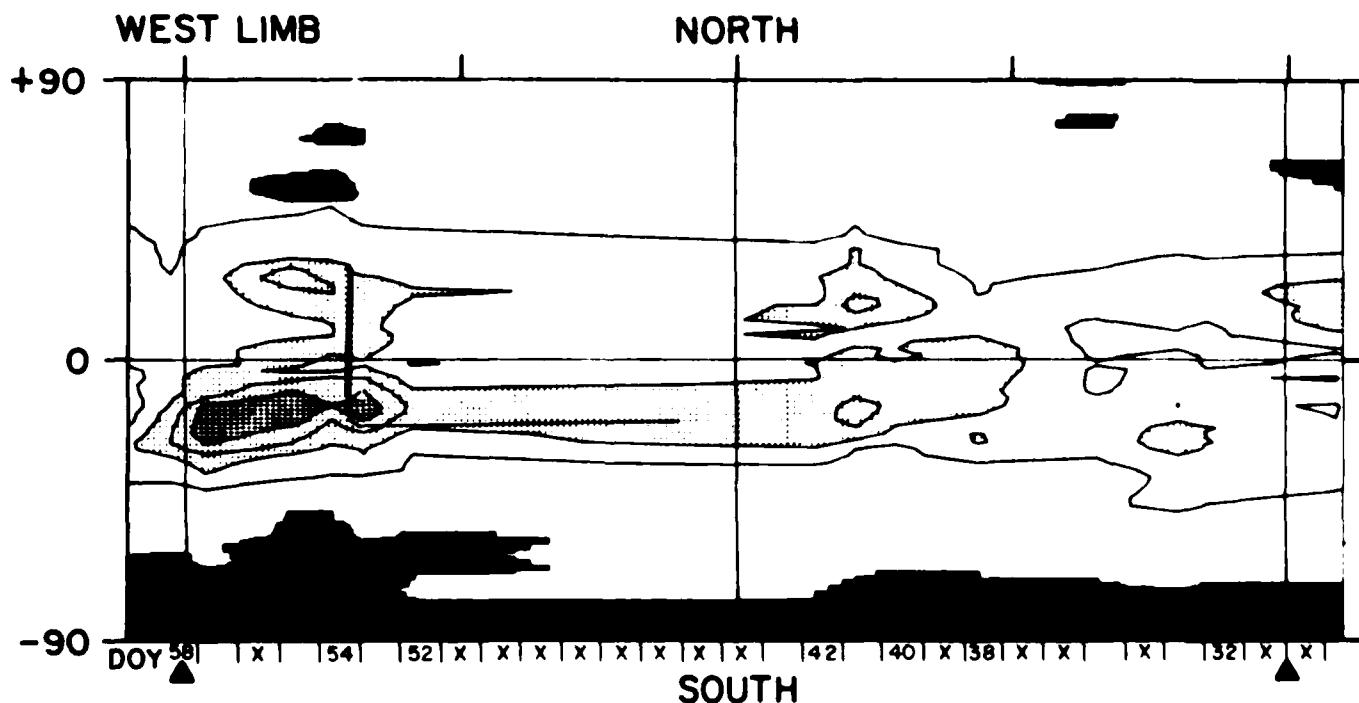
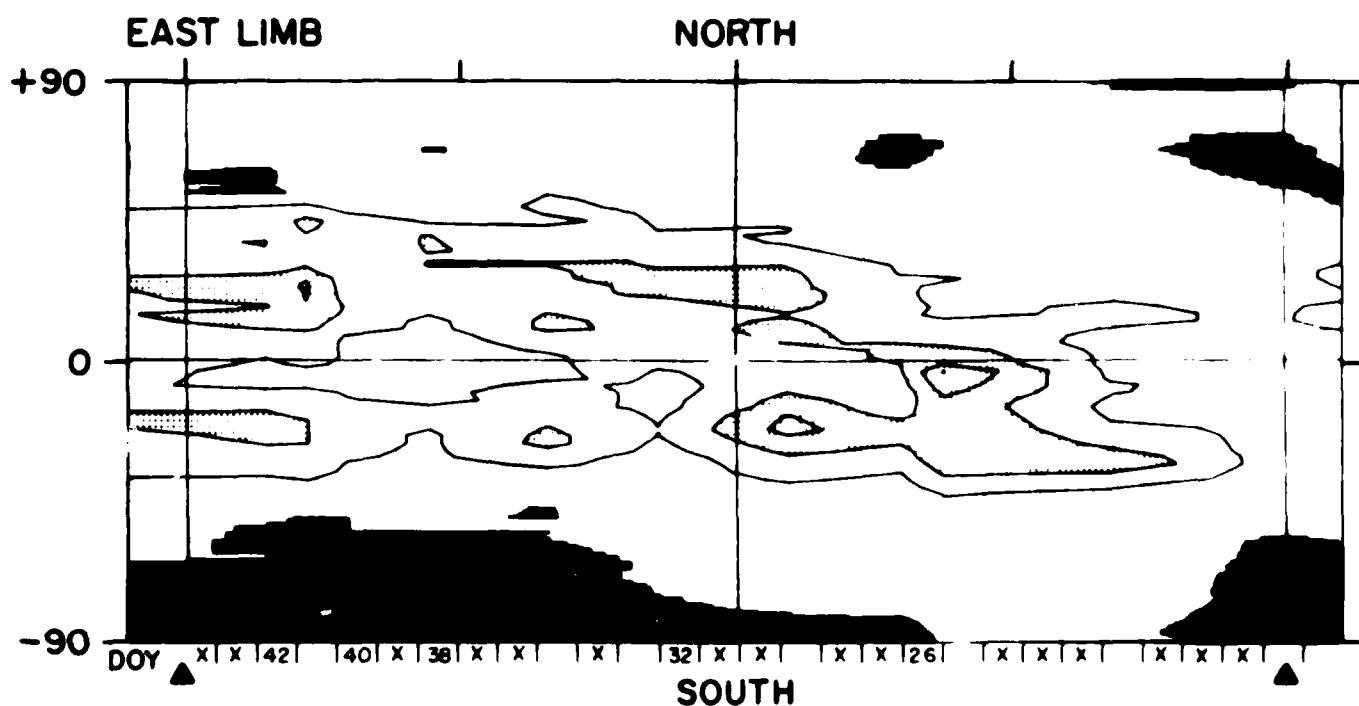


X = NO DATA

NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1691 HEIGHT 1.15 R<sub>sun</sub> YEAR 1980



X = NO DATA

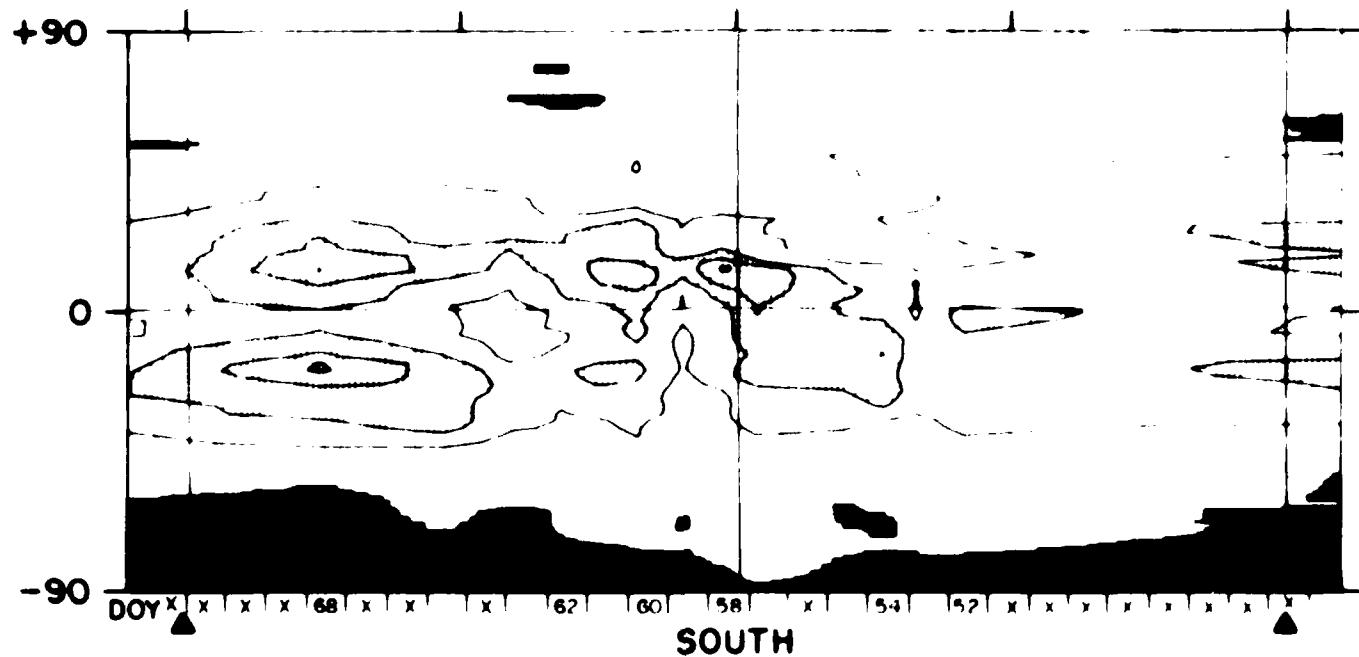
NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1692 HEIGHT 1.15 R<sub>s</sub> YEAR 1980

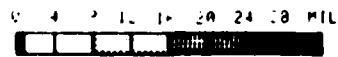
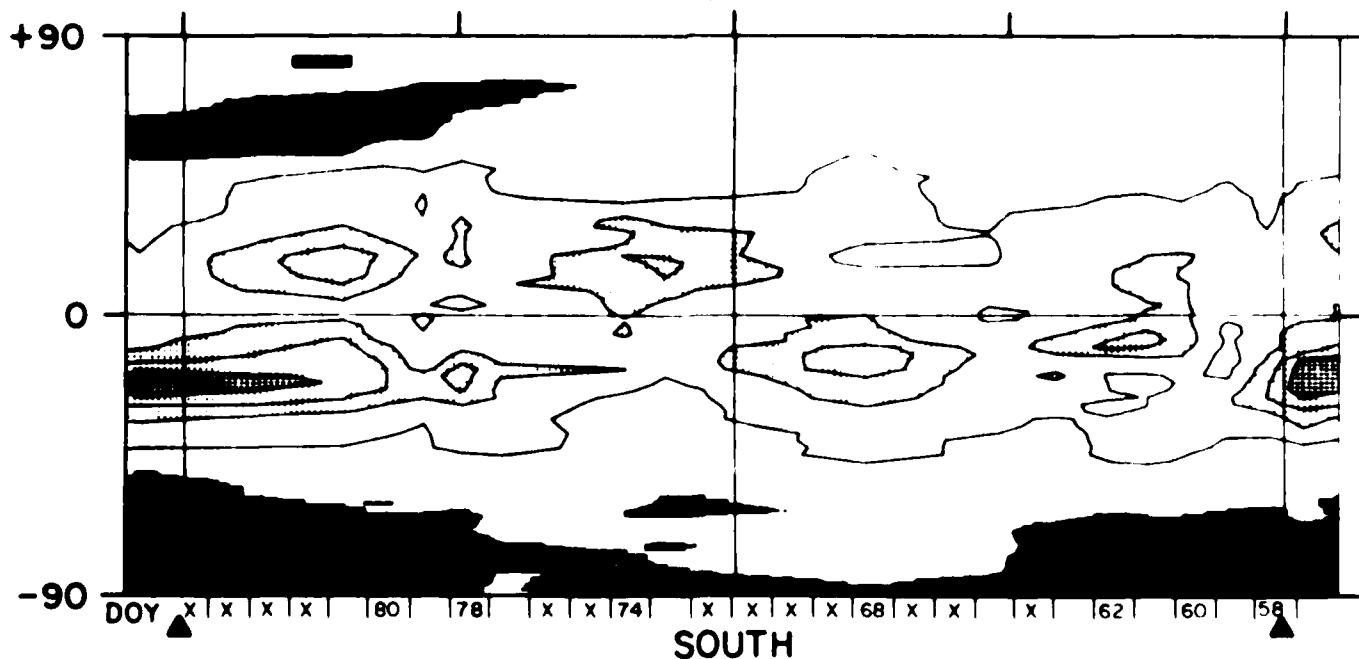
EAST LIMB

NORTH



WEST LIMB

NORTH



X = NO DATA

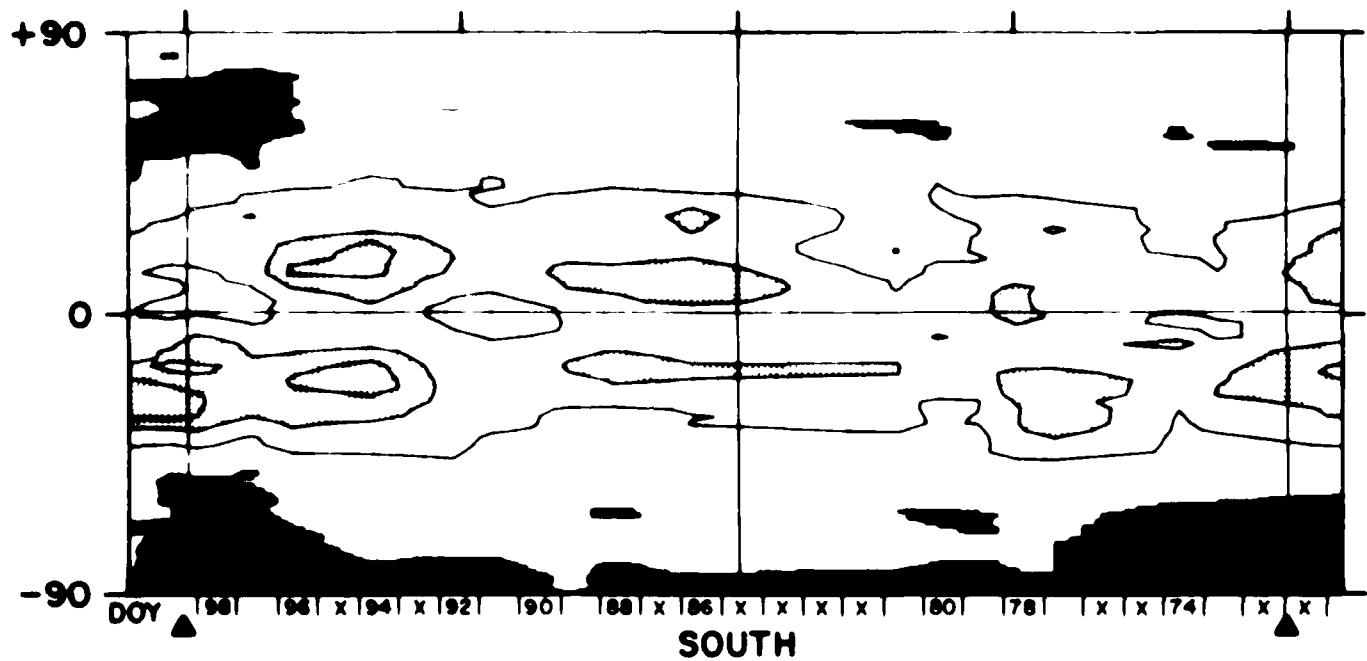
NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1693 HEIGHT 1.15R. YEAR 1980

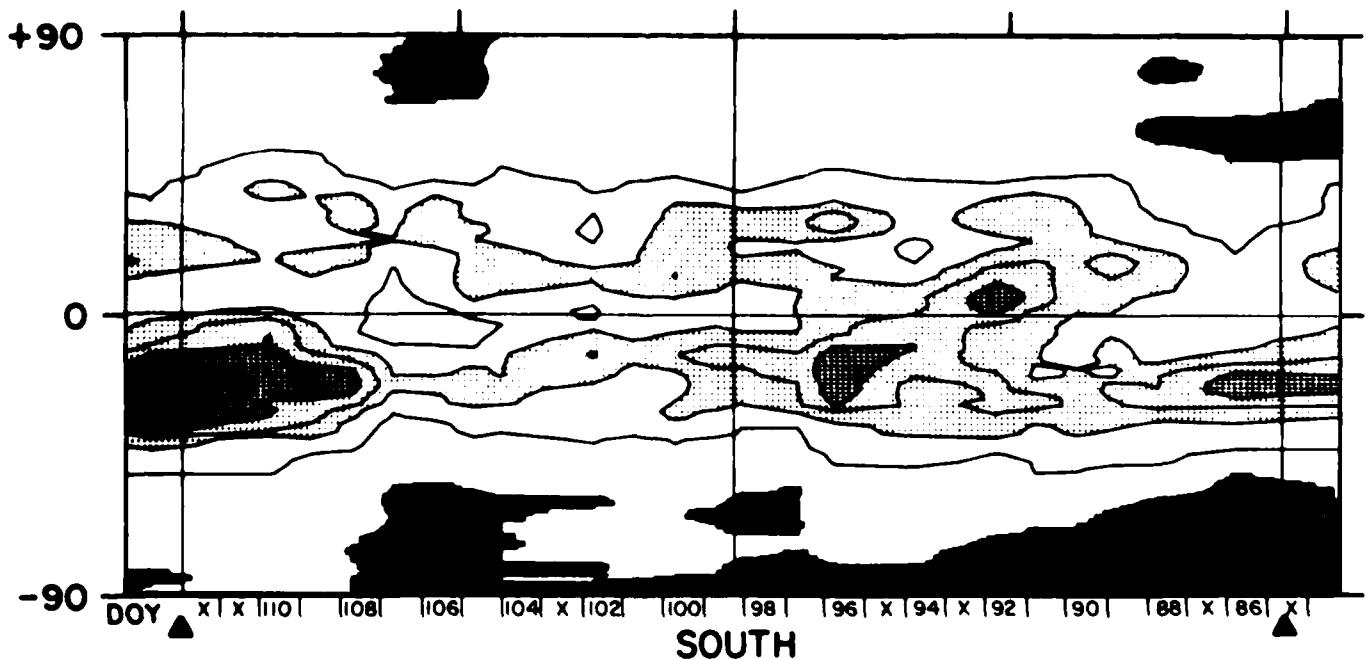
EAST LIMB

NORTH



WEST LIMB

NORTH



X = NO DATA

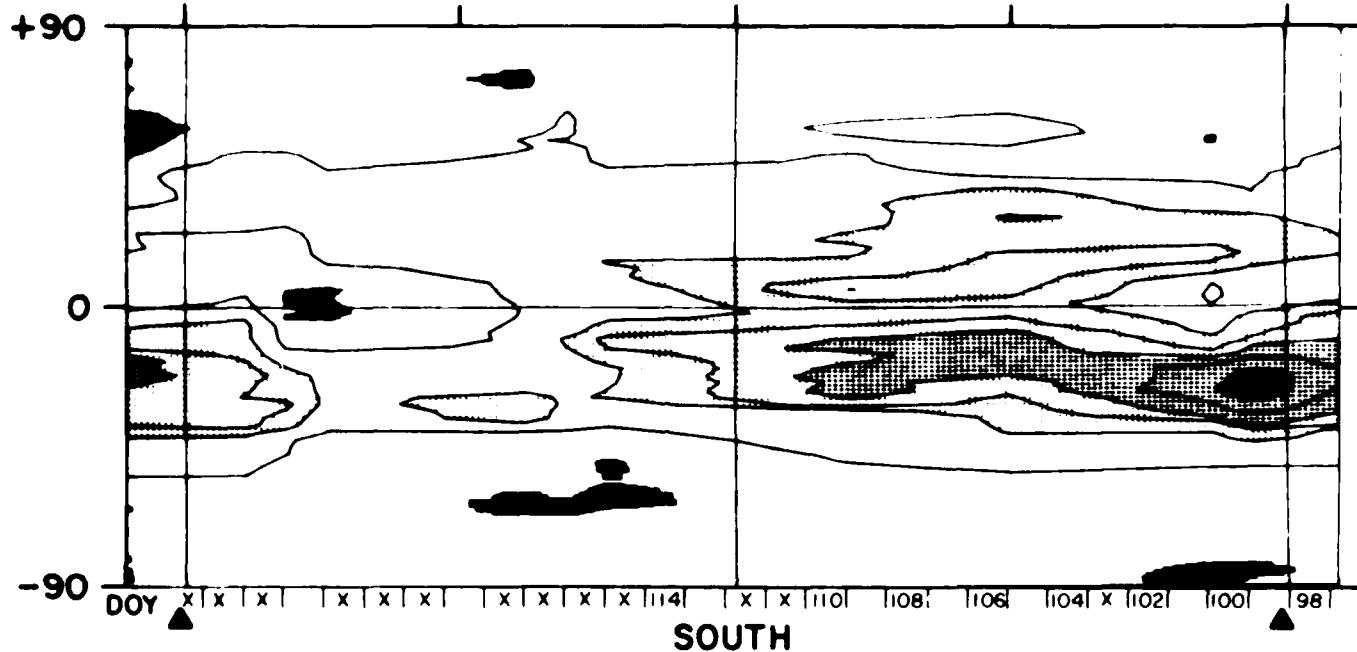
# NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1694 HEIGHT 1.15R. YEAR 1980

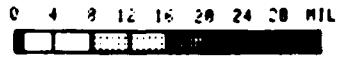
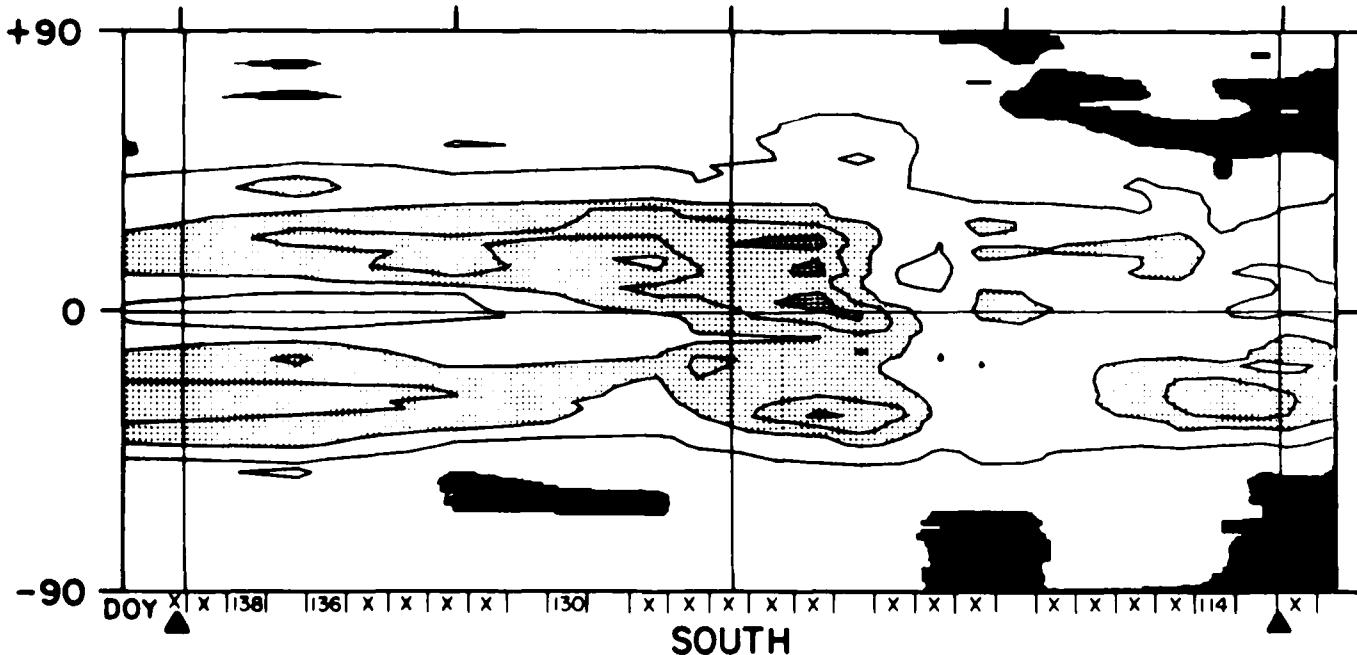
EAST LIMB

NORTH



WEST LIMB

NORTH

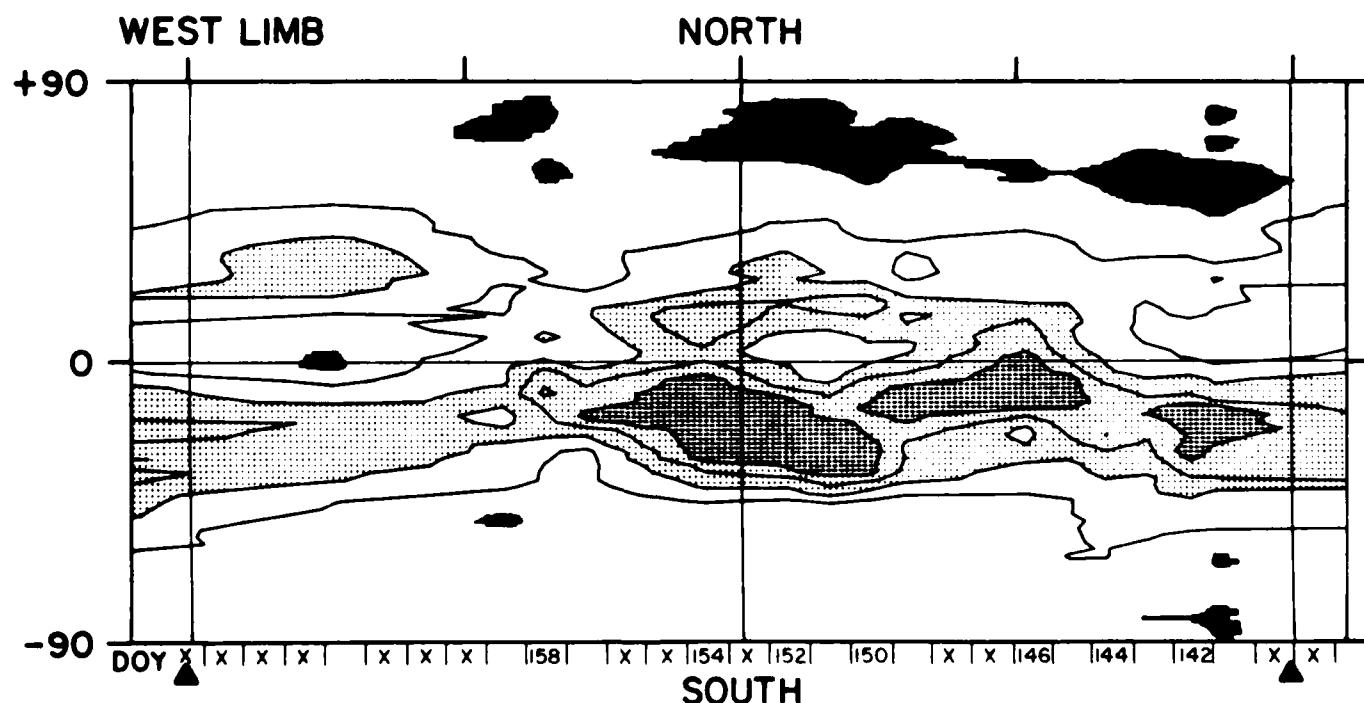
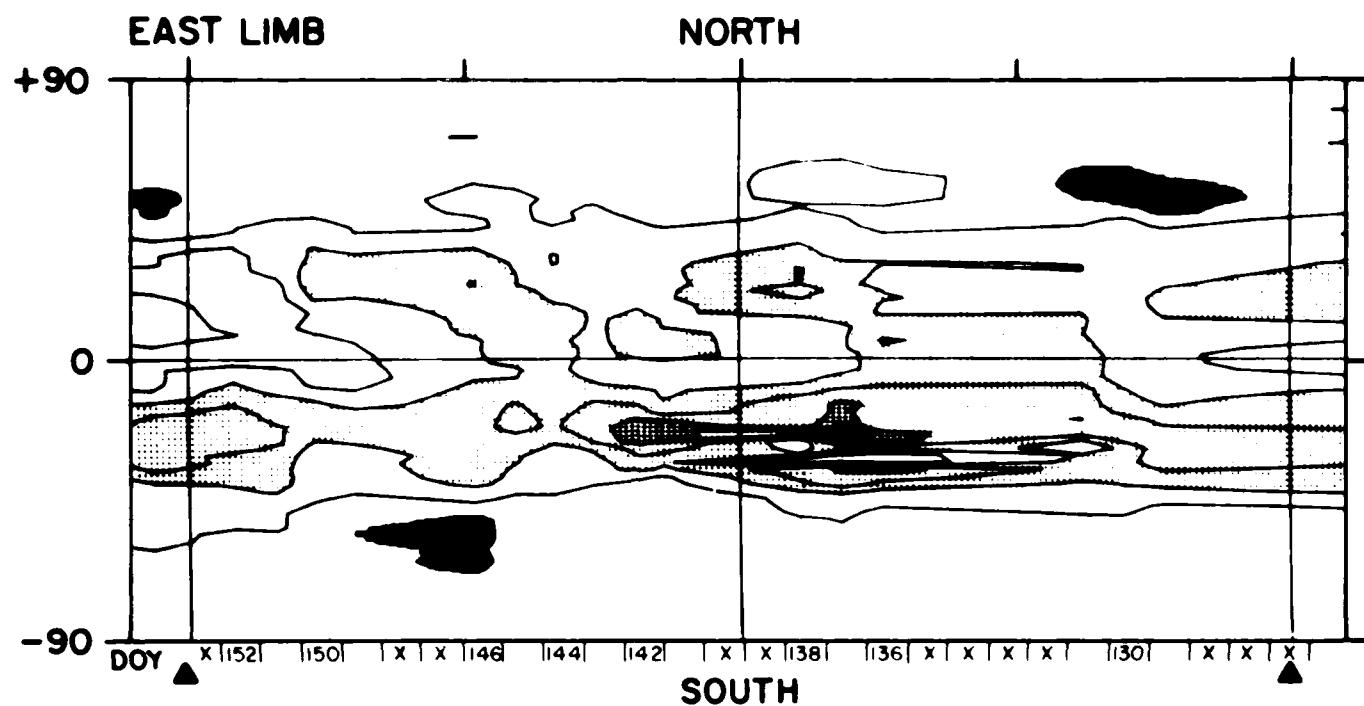


X = NO DATA

NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1695 HEIGHT 1.15 R<sub>o</sub> YEAR 1980



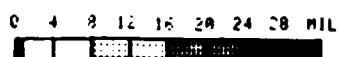
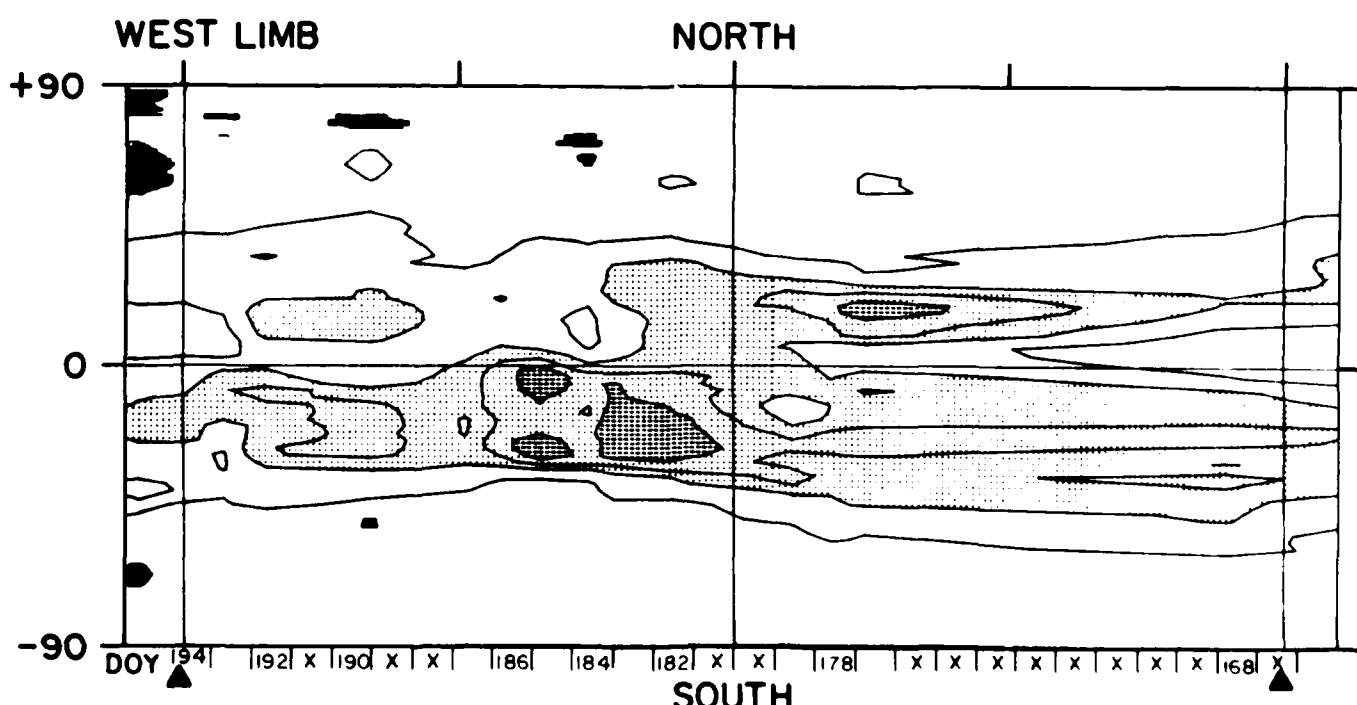
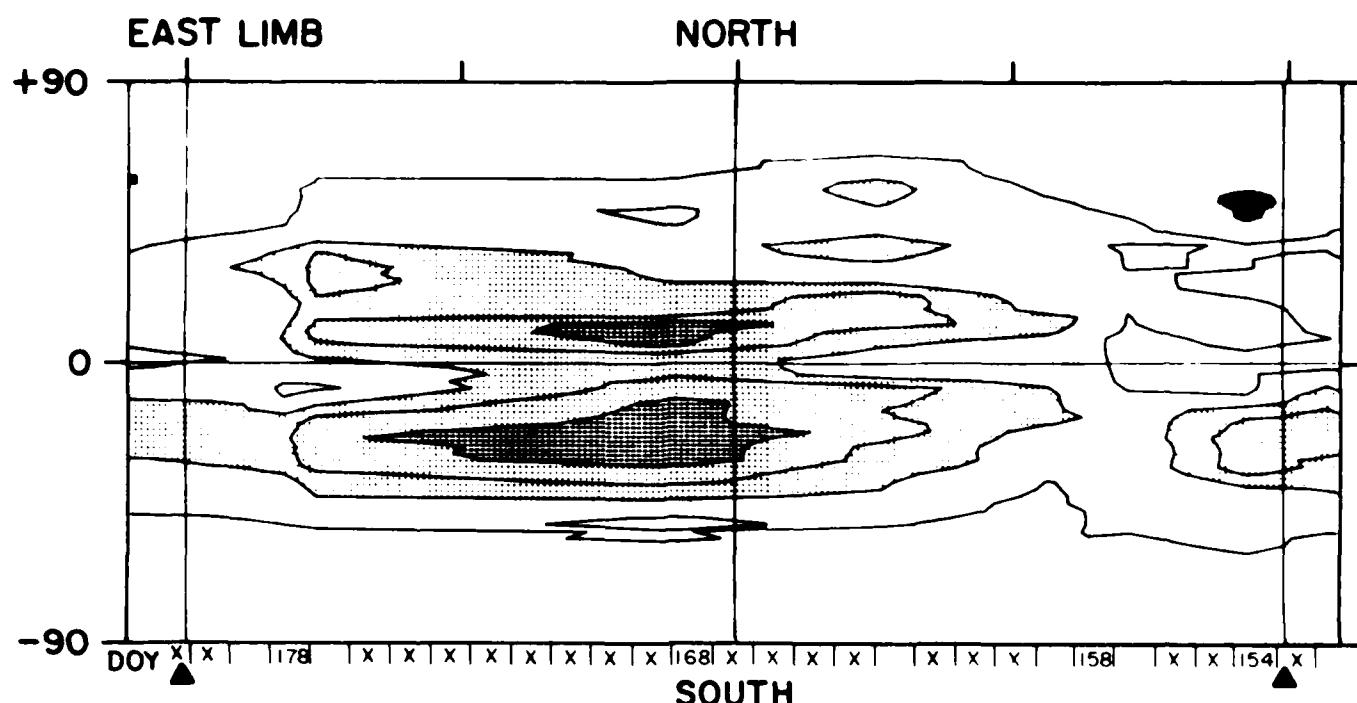
0 4 8 12 16 20 24 28 MIL

X = NO DATA

# NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1696 HEIGHT 1.15R. YEAR 1980



X = NO DATA

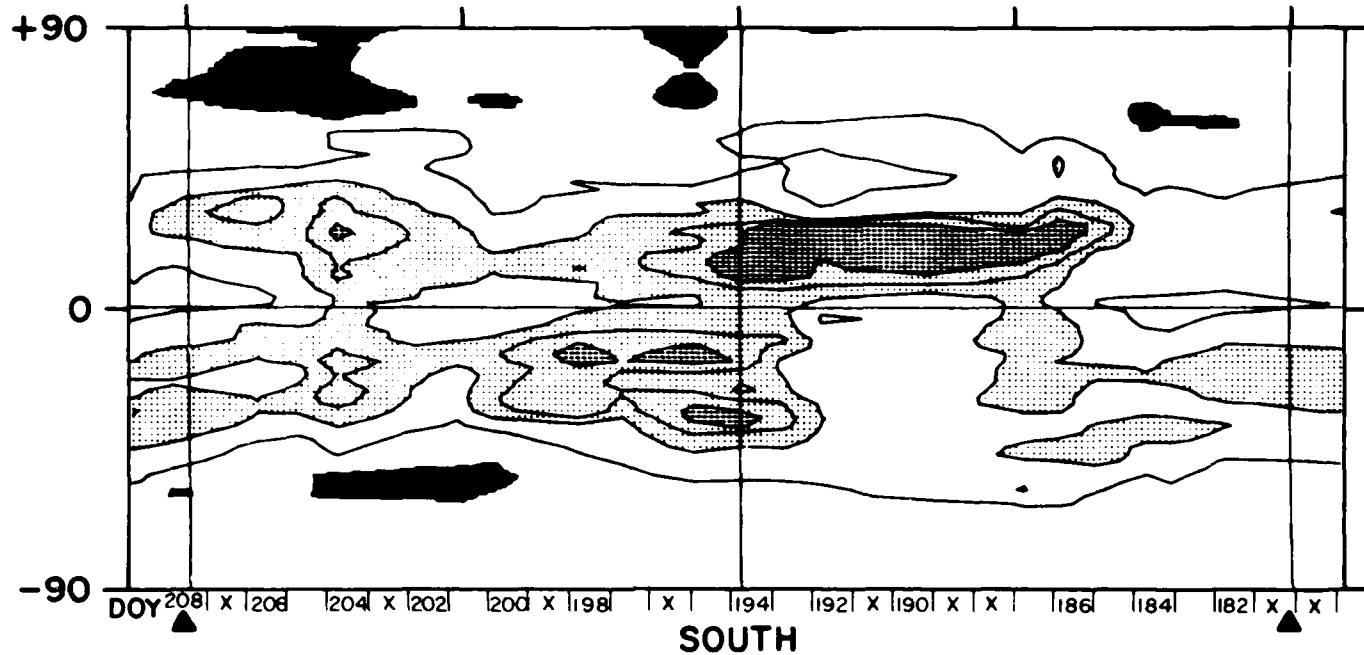
# NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1697 HEIGHT 1.15 R<sub>•</sub> YEAR 1980

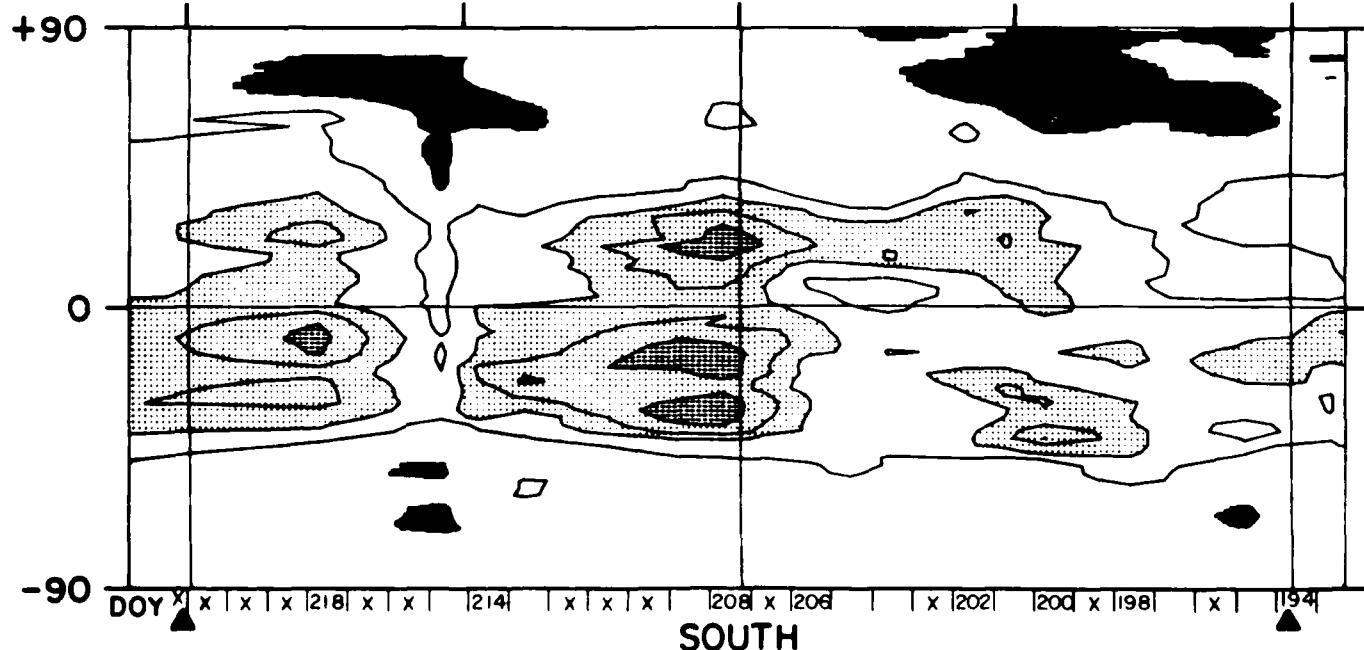
EAST LIMB

NORTH



WEST LIMB

NORTH

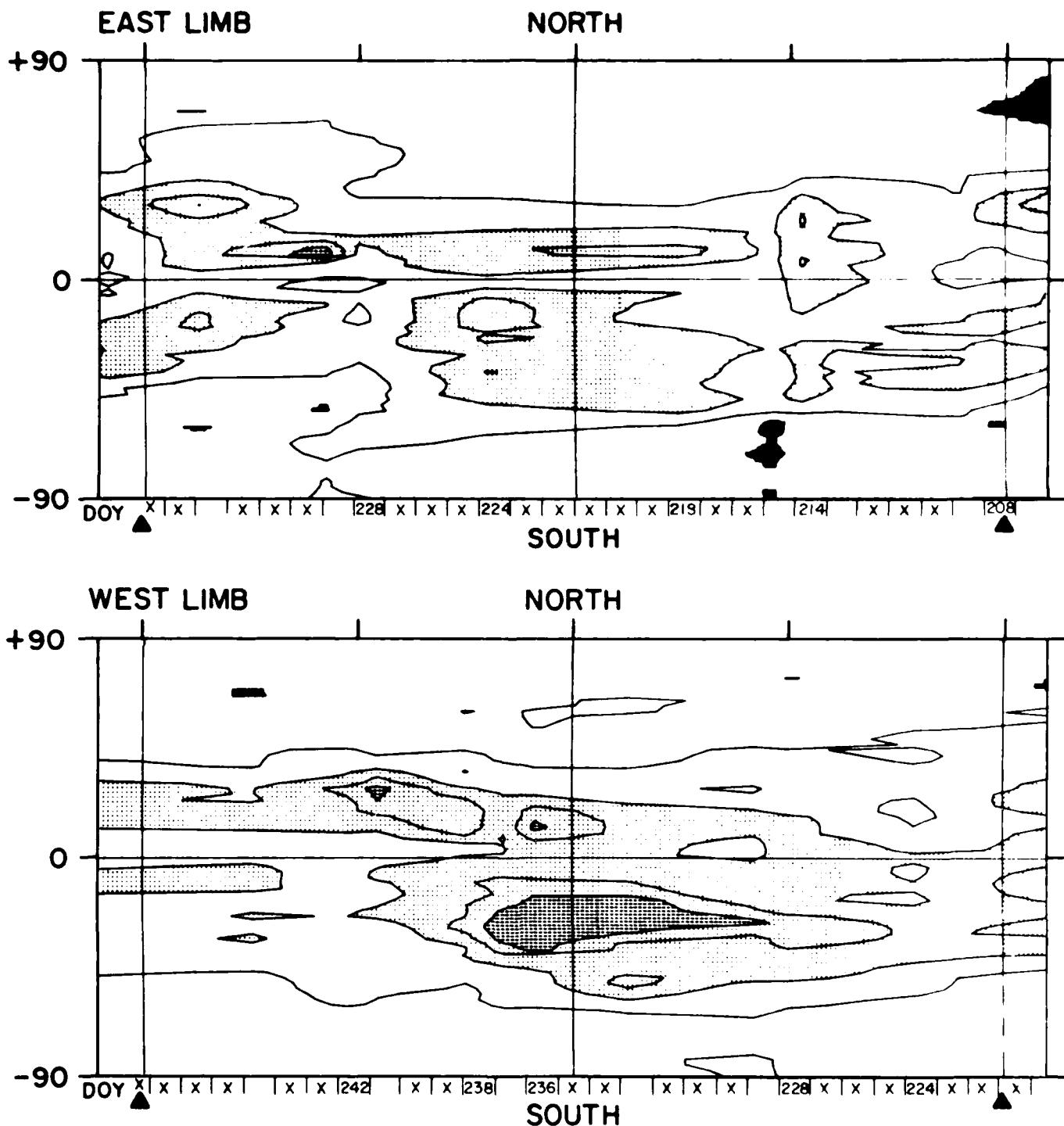


X = NO DATA

**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK**

**Fe XIV, 5303 Å CORONAL PHOTOMETER**

**ROTATION 1698 HEIGHT 1.15R<sub>o</sub> YEAR 1980**



X = NO DATA

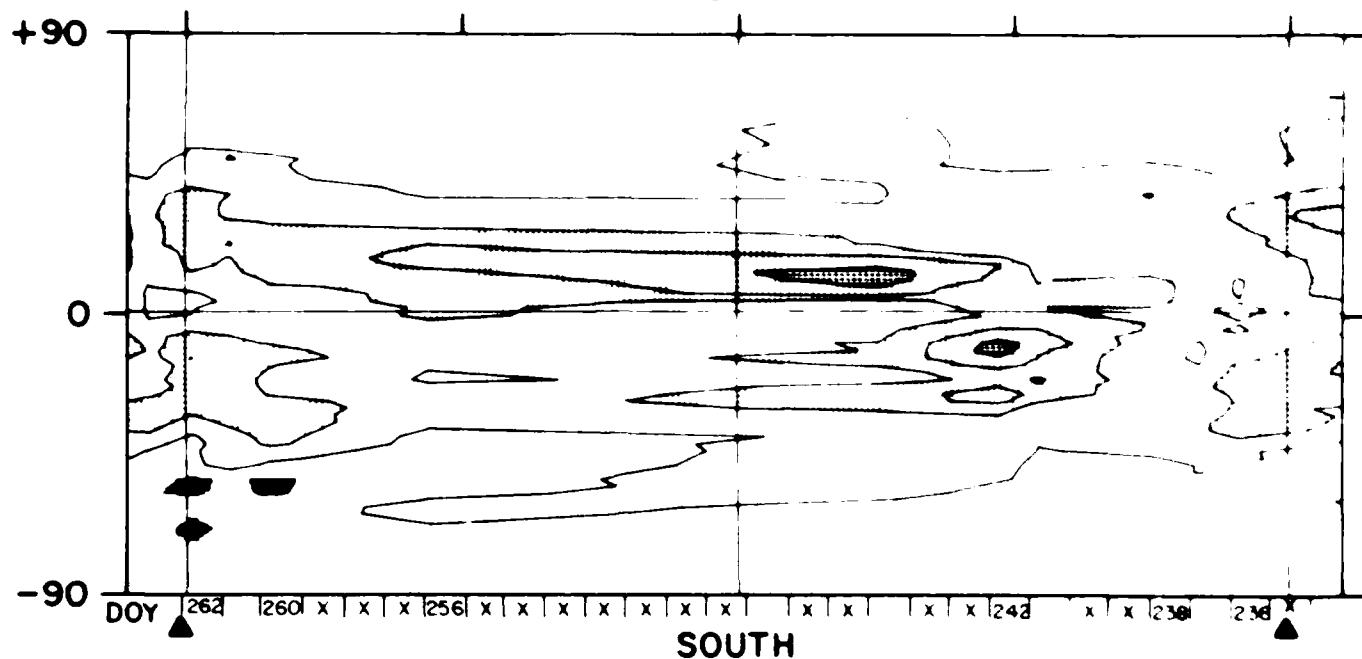
NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1699 HEIGHT 115R. YEAR 1980

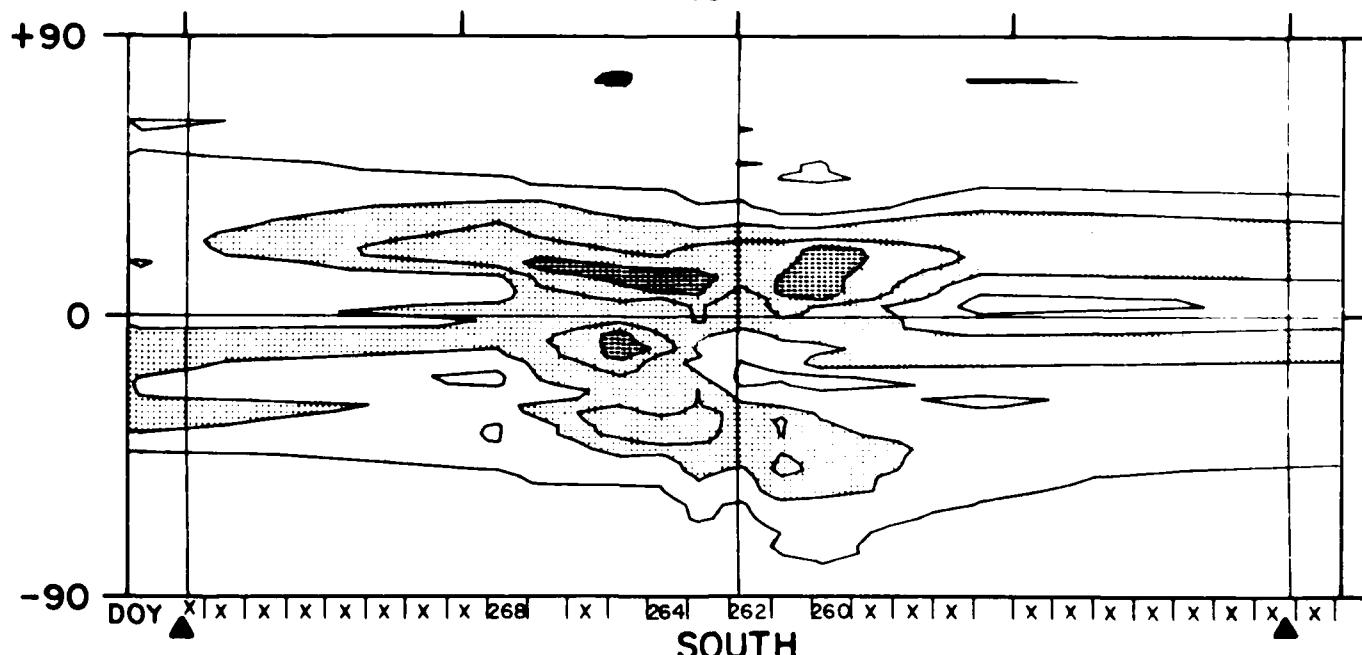
EAST LIMB

NORTH

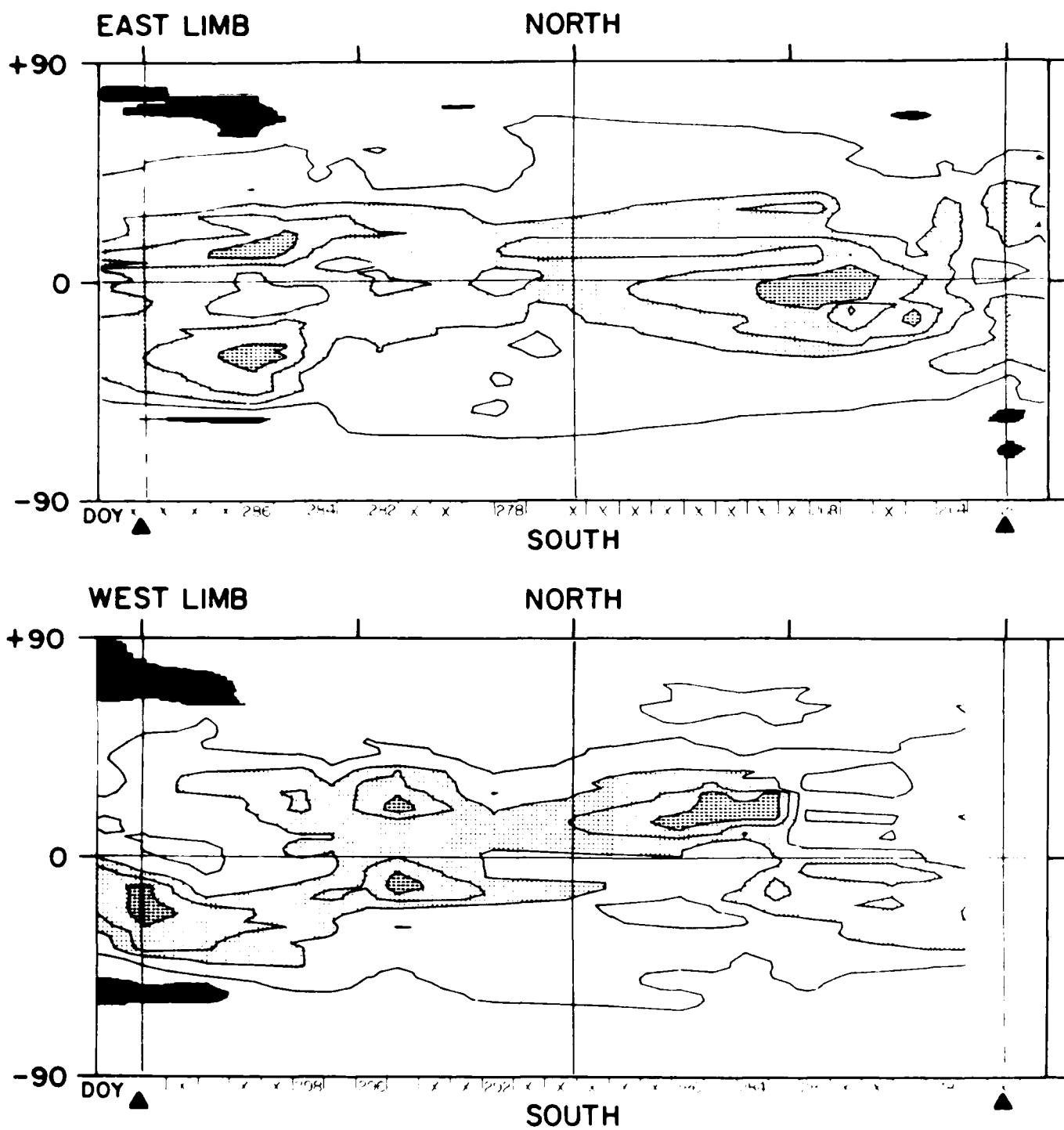


WEST LIMB

NORTH



X = NO DATA

**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK****Fe XIV, 5303 Å CORONAL PHOTOMETER****ROTATION 1700 HEIGHT 1.15R<sub>•</sub> YEAR 1980**

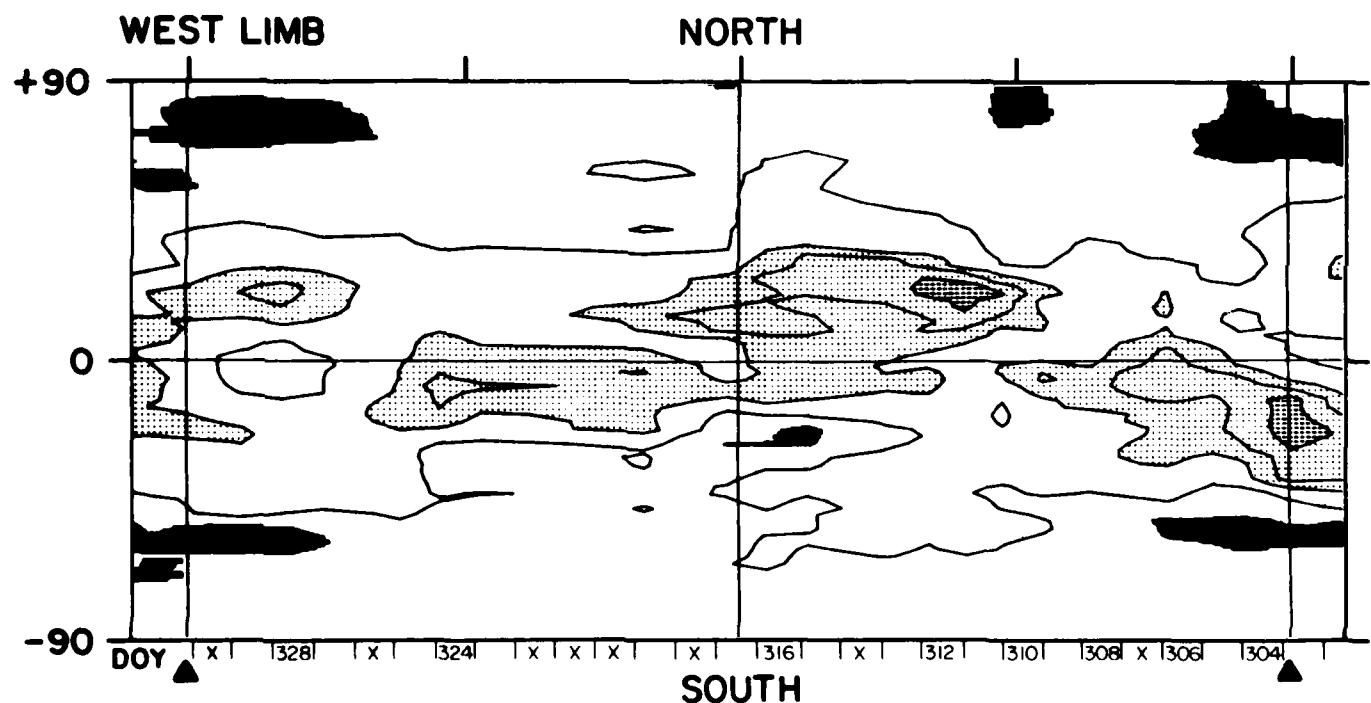
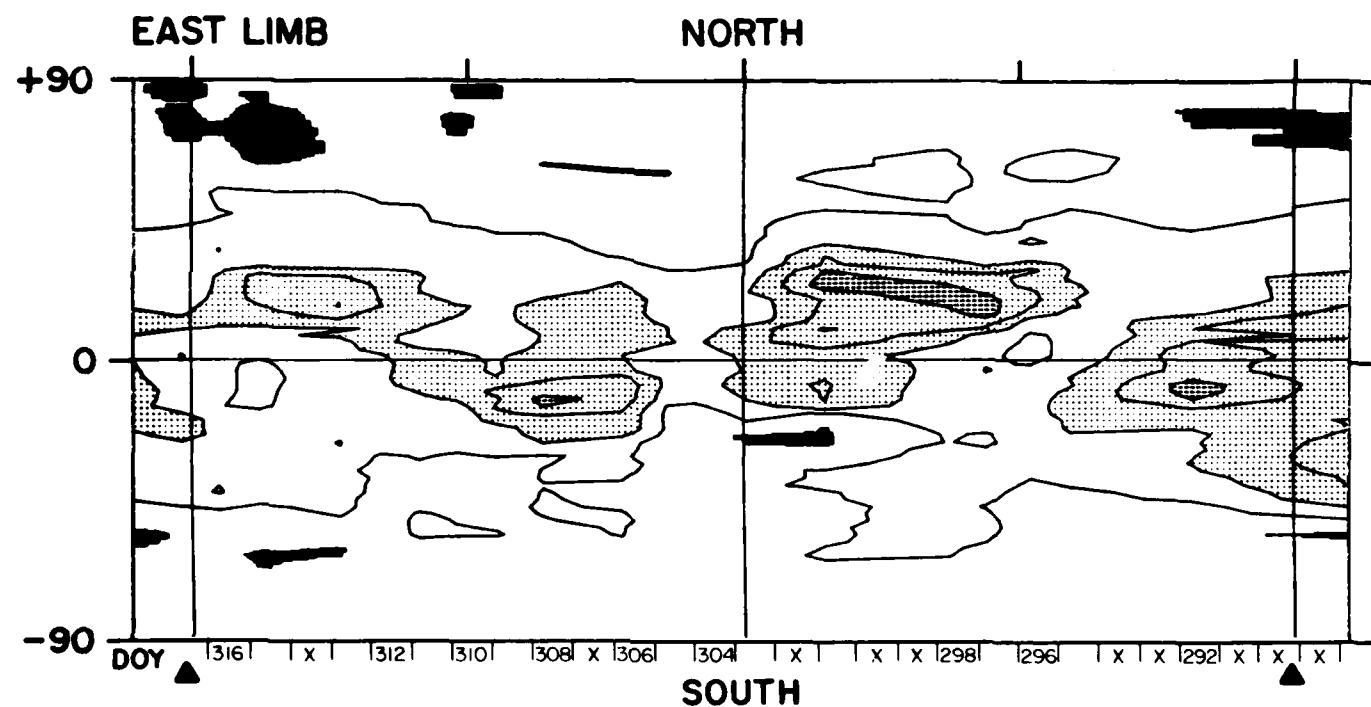
C 4 5 10 20 24 28 MIL

X = NO DATA

# NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1701 HEIGHT 1.15 R<sub>•</sub> YEAR 1980



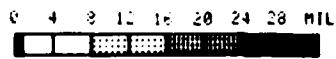
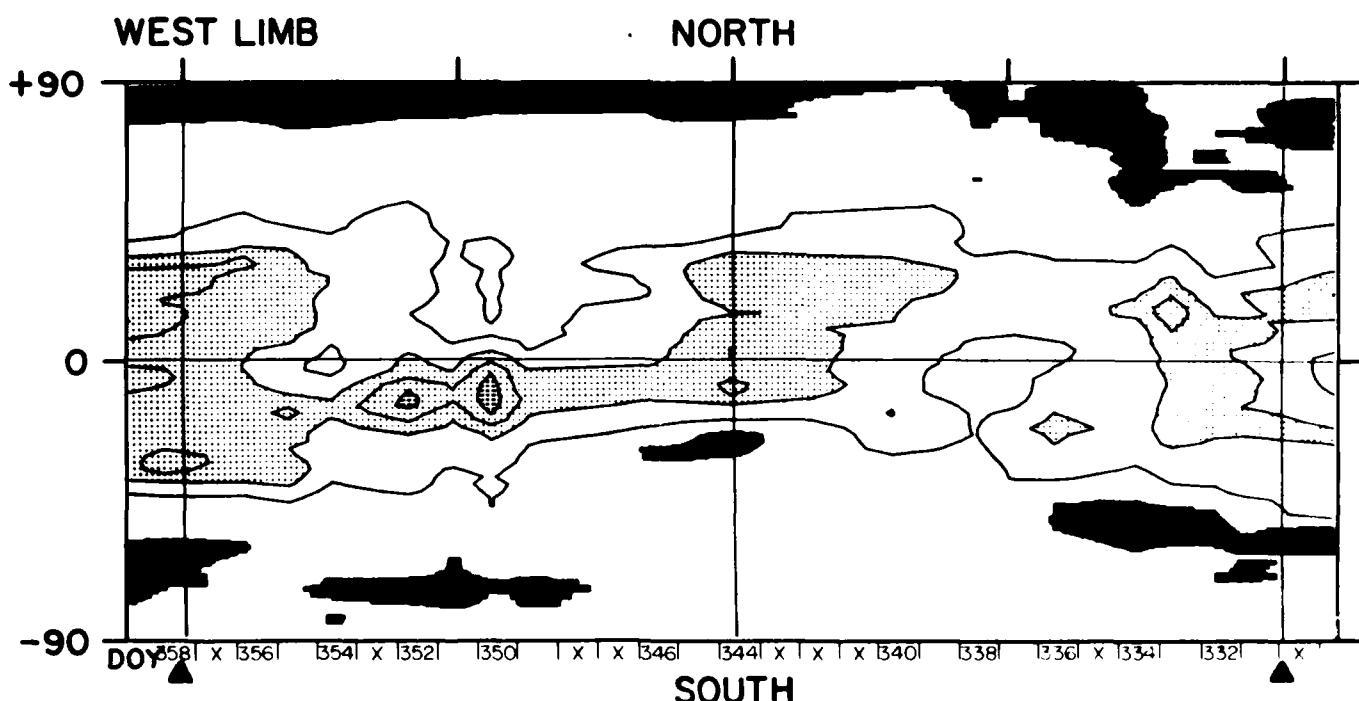
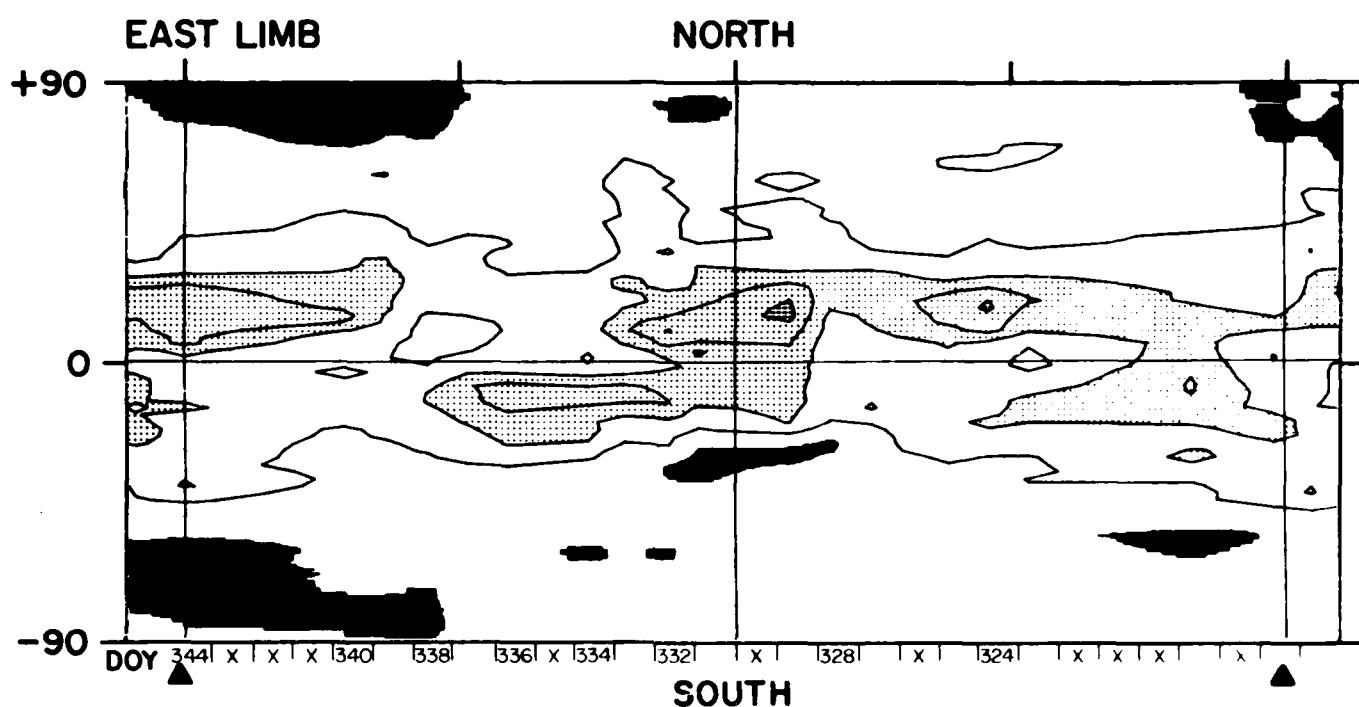
0 4 8 12 16 20 24 28 MIL

X = NO DATA

**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK**

**Fe XIV, 5303 Å CORONAL PHOTOMETER**

**ROTATION 1702 HEIGHT 1.15R<sub>•</sub> YEAR 1980**

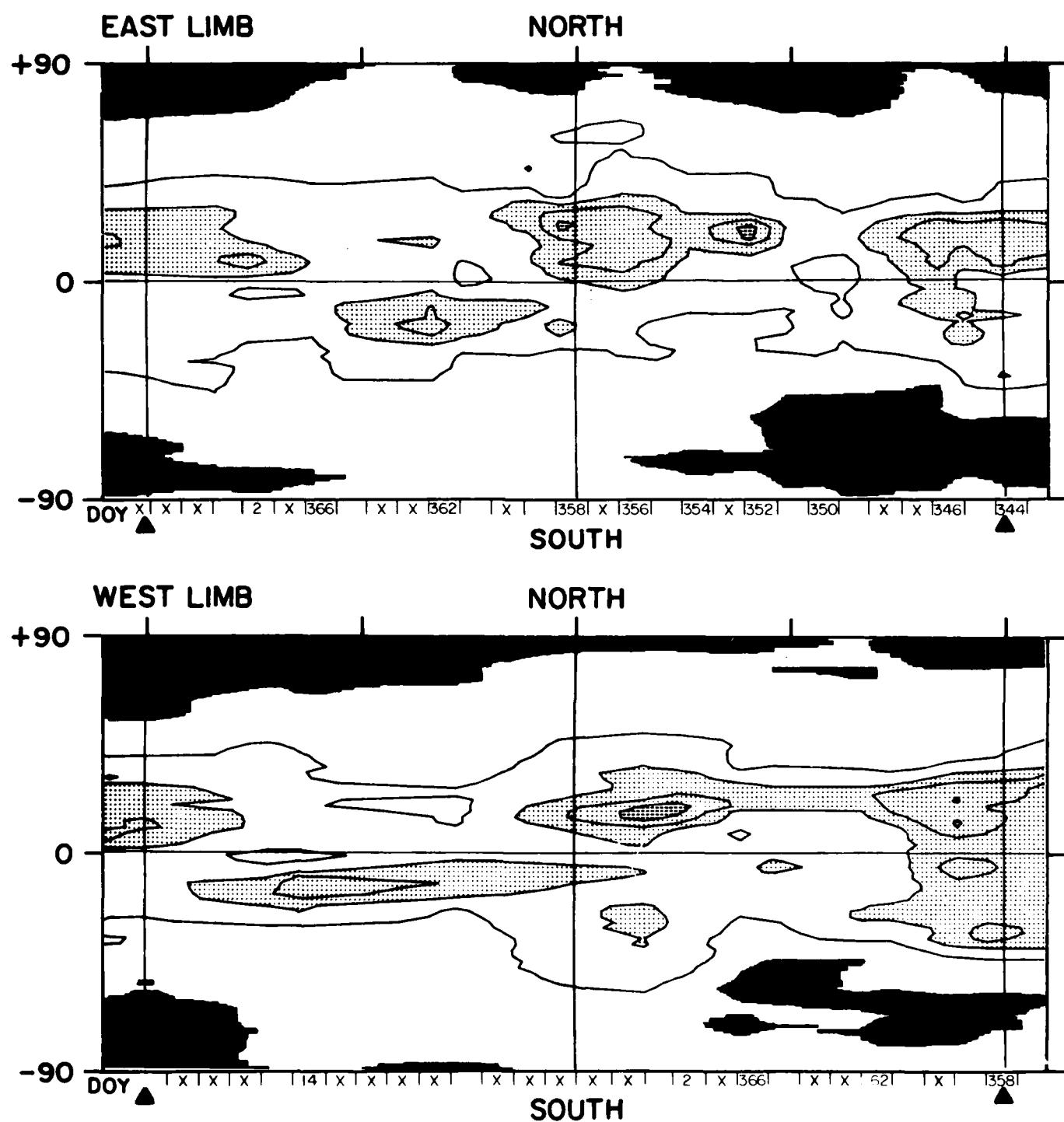


X = NO DATA

# NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1703 HEIGHT 1.15 R<sub>o</sub> YEAR 1980

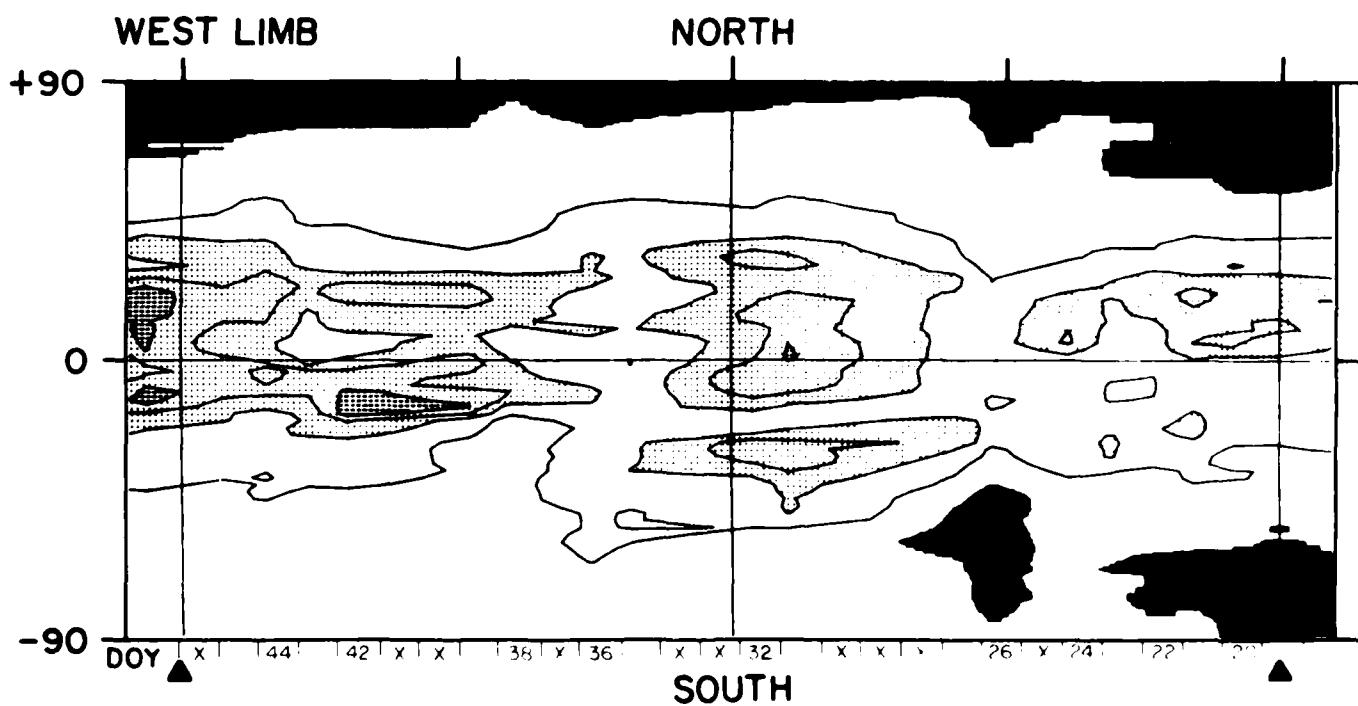
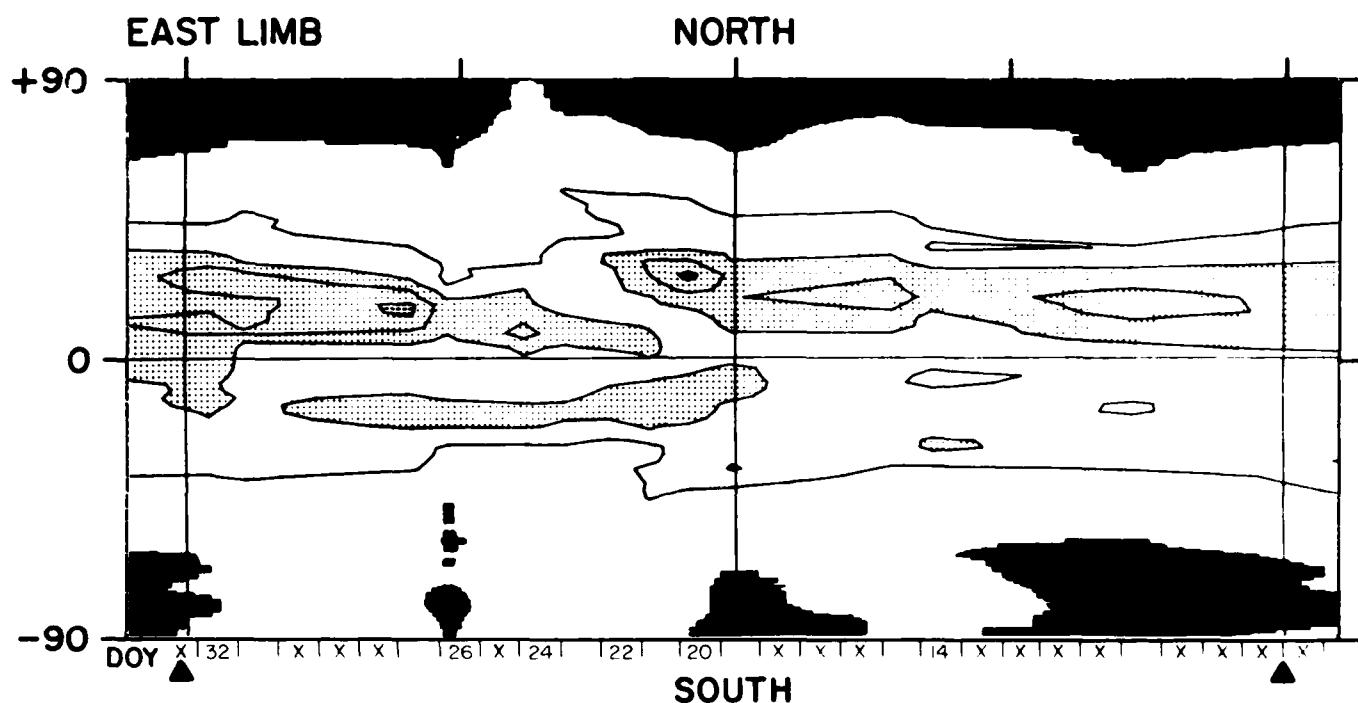


X = NO DATA

# NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1704 HEIGHT 1.15 R<sub>sun</sub> YEAR 1981

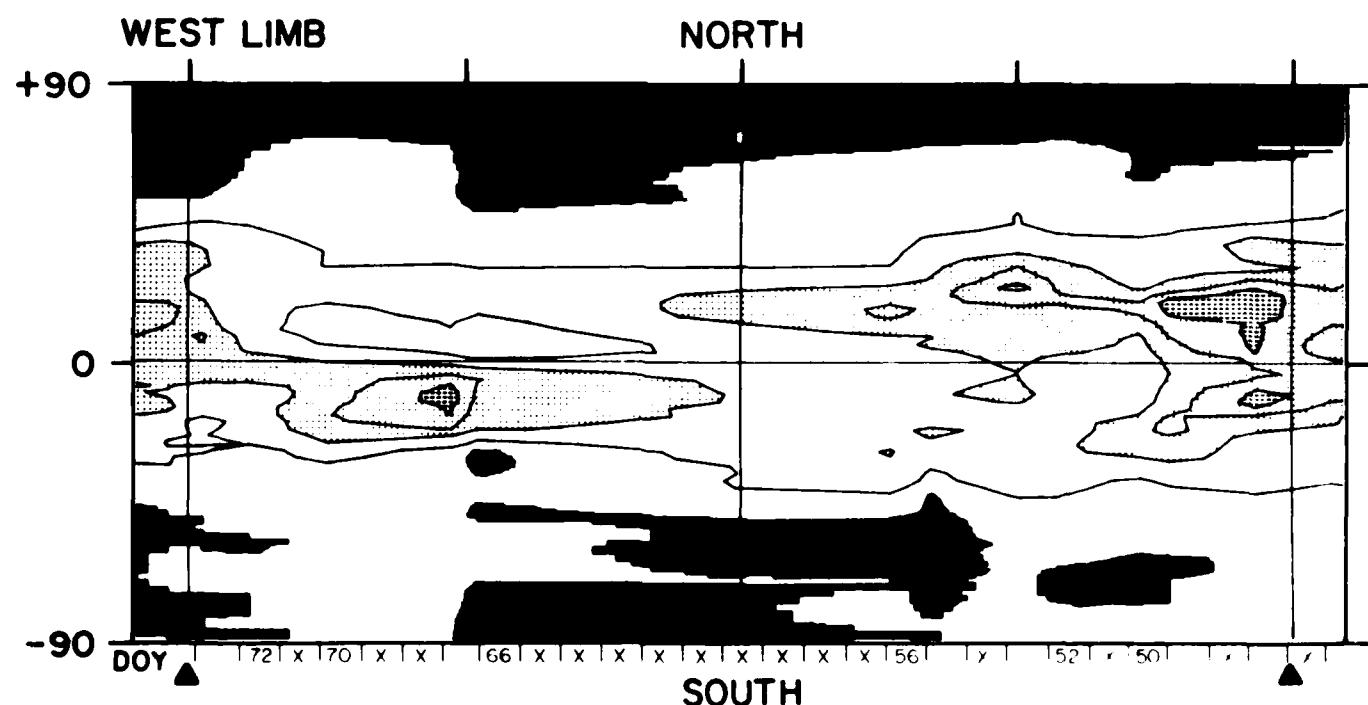
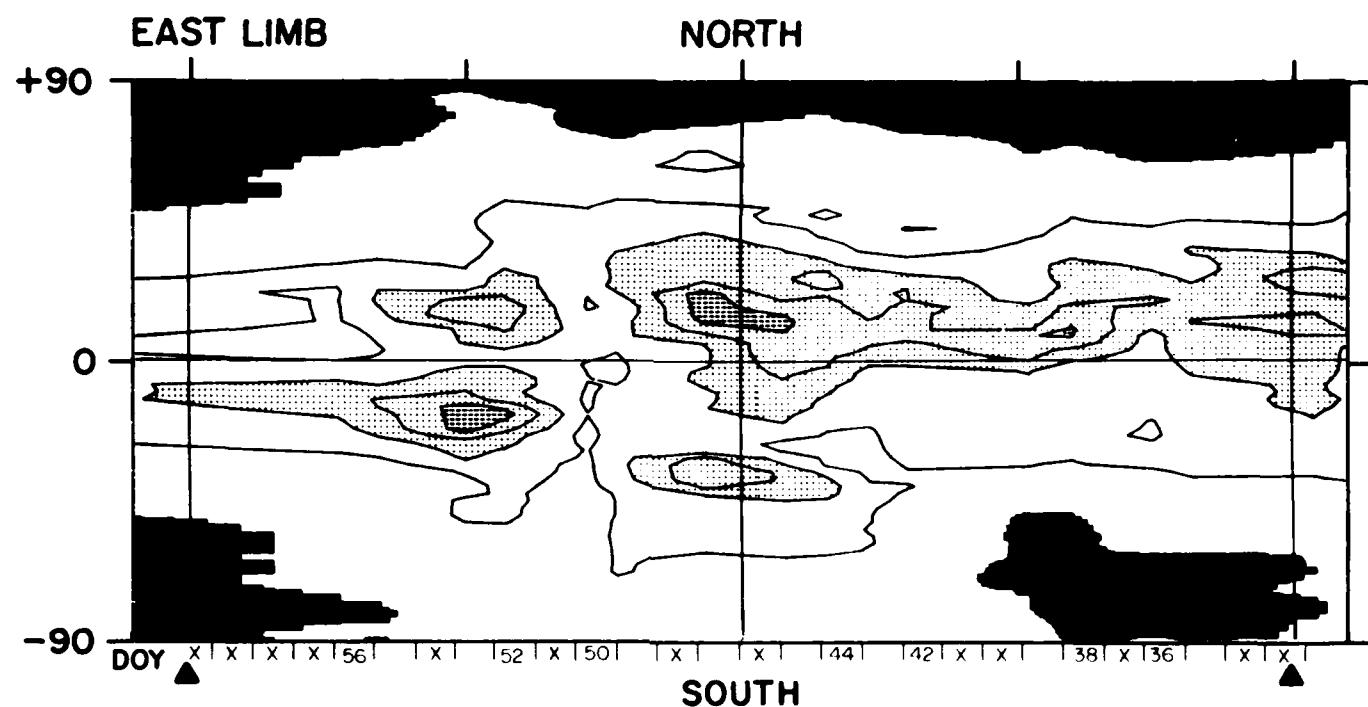


X = NO DATA

# NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

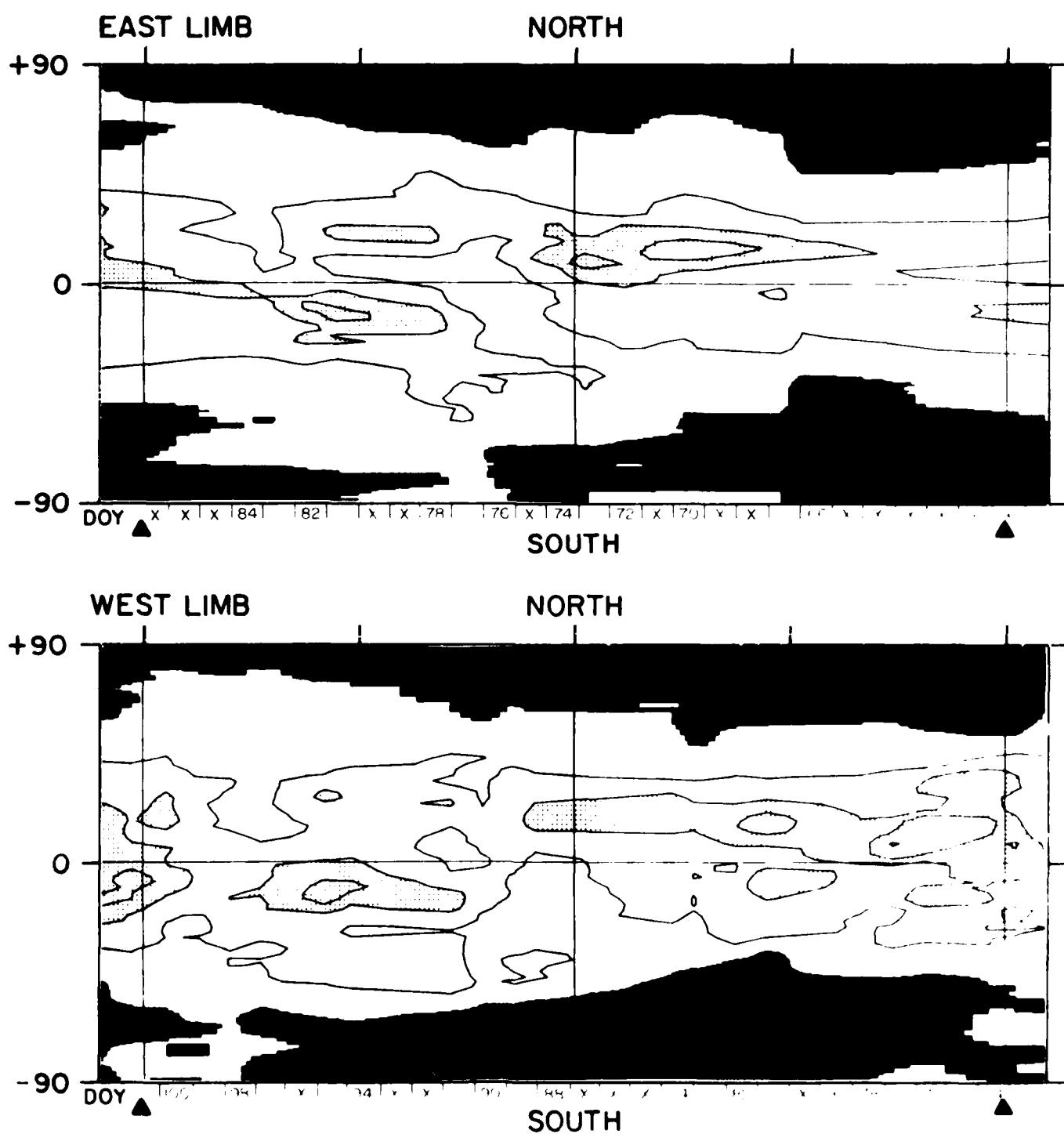
Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1705 HEIGHT 1.15 R<sub>⊕</sub> YEAR 1981



0 4 8 12 16 20 24 28 MIL

X = NO DATA

**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK****Fe XIV, 5303 Å CORONAL PHOTOMETER****ROTATION 1706 HEIGHT 1.15 R<sub>o</sub> YEAR 1981**

X = NO DATA

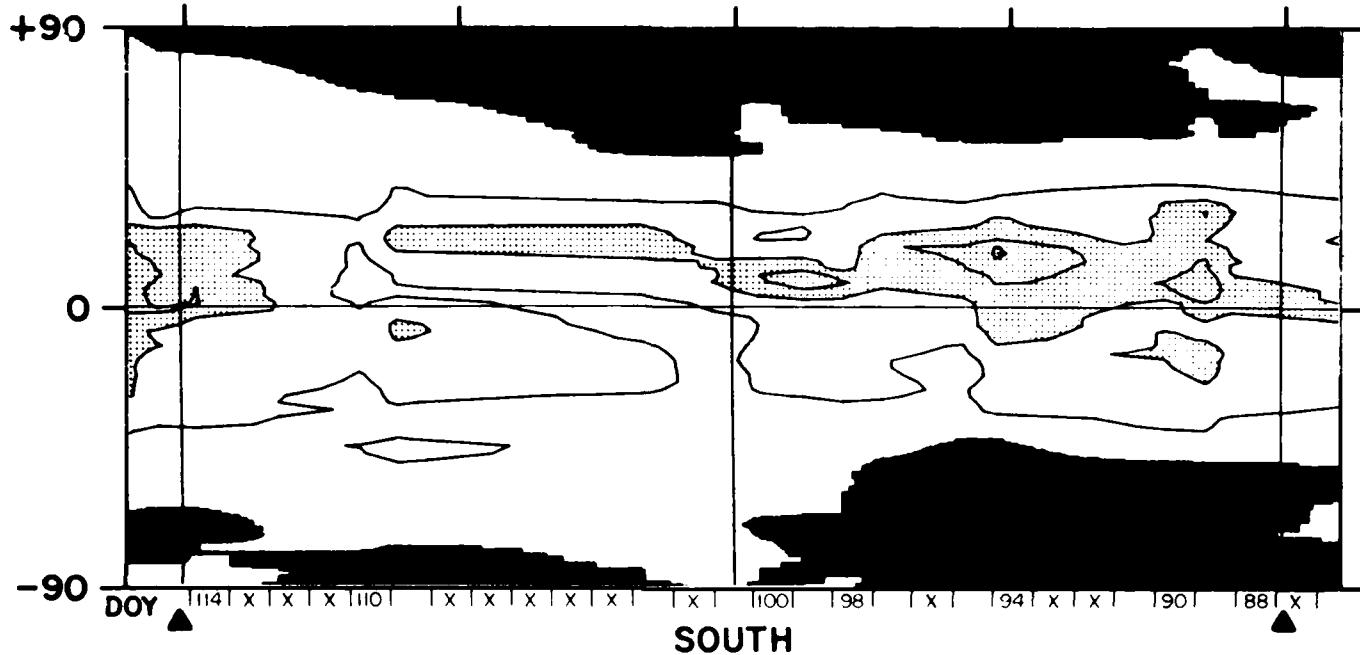
# NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1707 HEIGHT 1.15 R<sub>⊕</sub> YEAR 1981

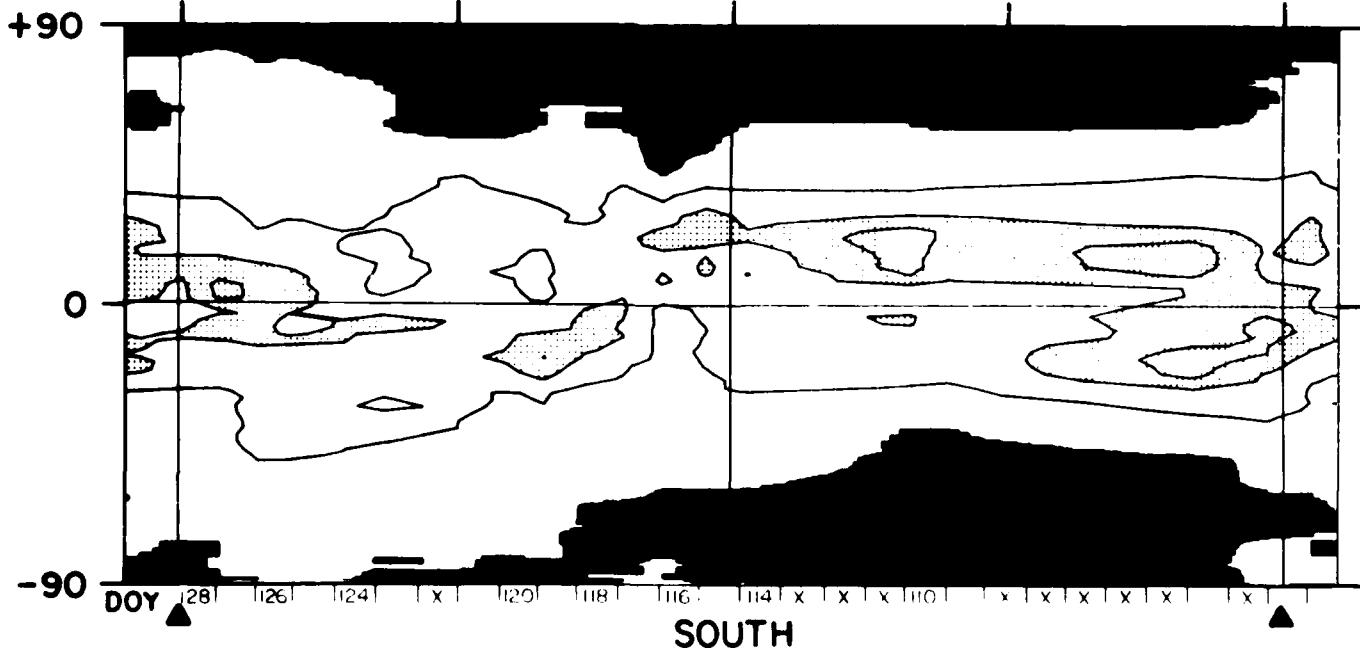
EAST LIMB

NORTH



WEST LIMB

NORTH



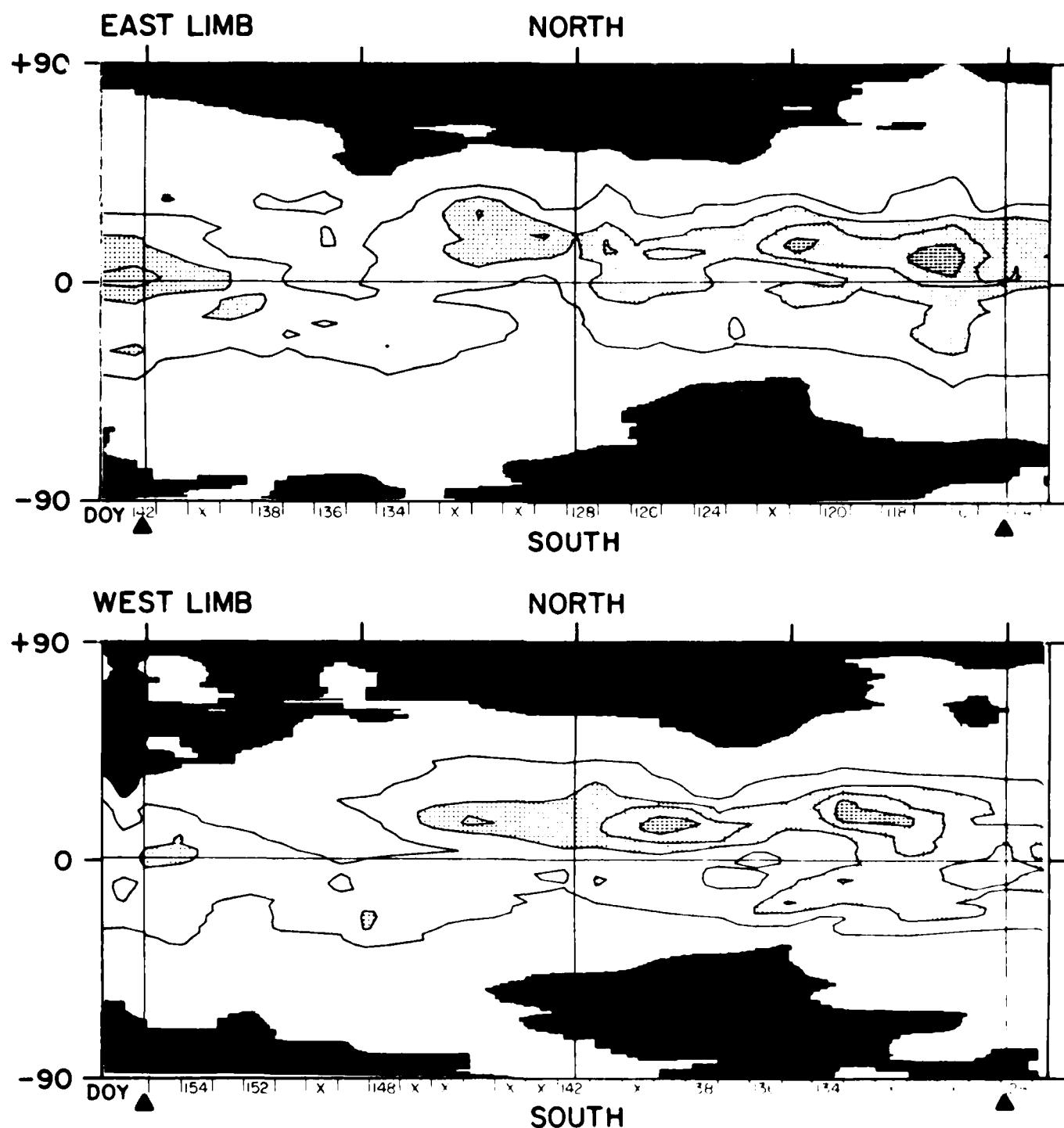
0 4 8 12 16 20 24 28 MIL

X = NO DATA

# NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1708 HEIGHT 1.15 R<sub>o</sub> YEAR 1981



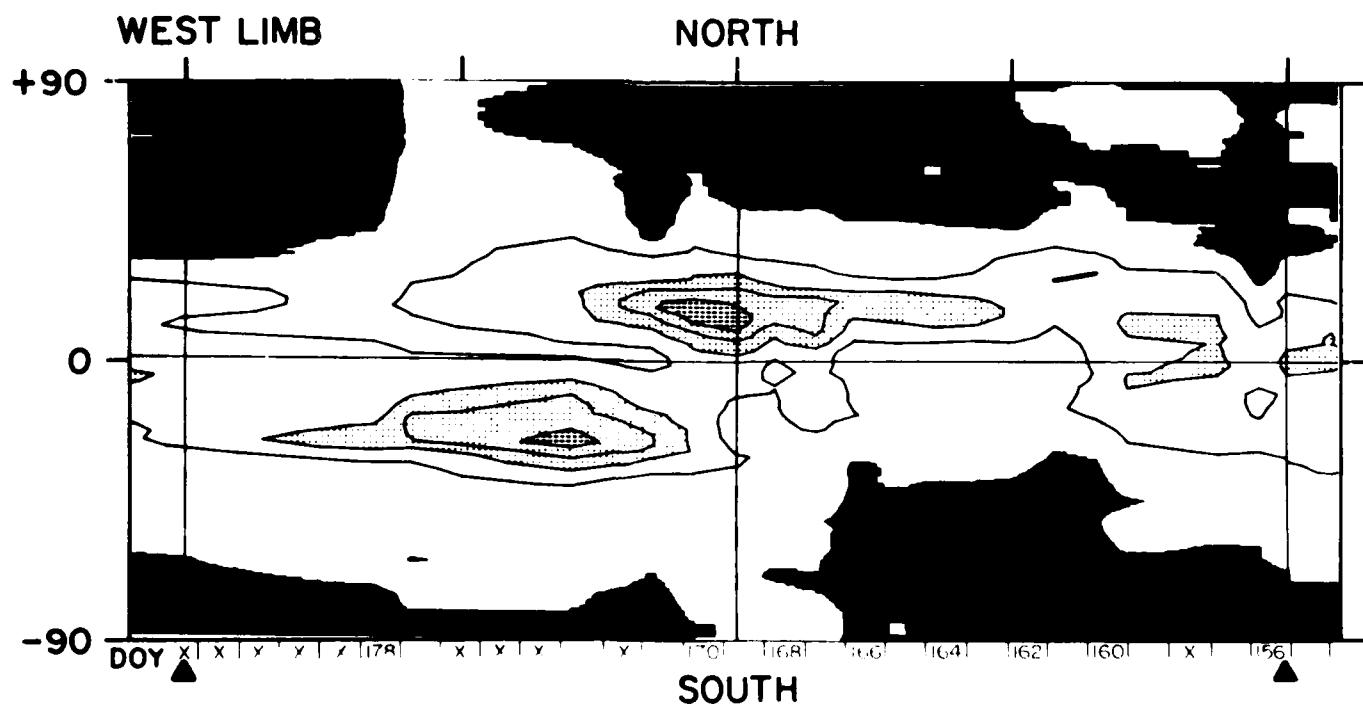
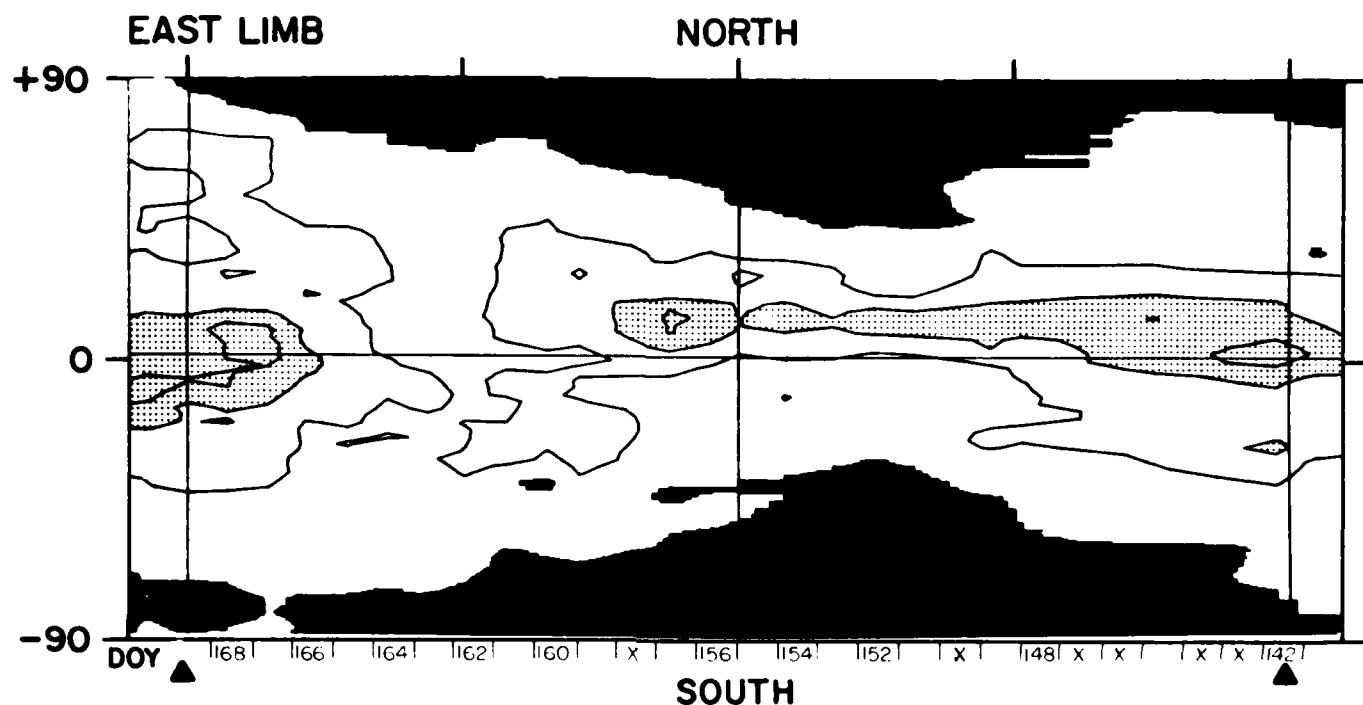
0 4 8 12 16 20 24 28 MIL

X = NO DATA

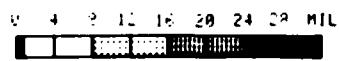
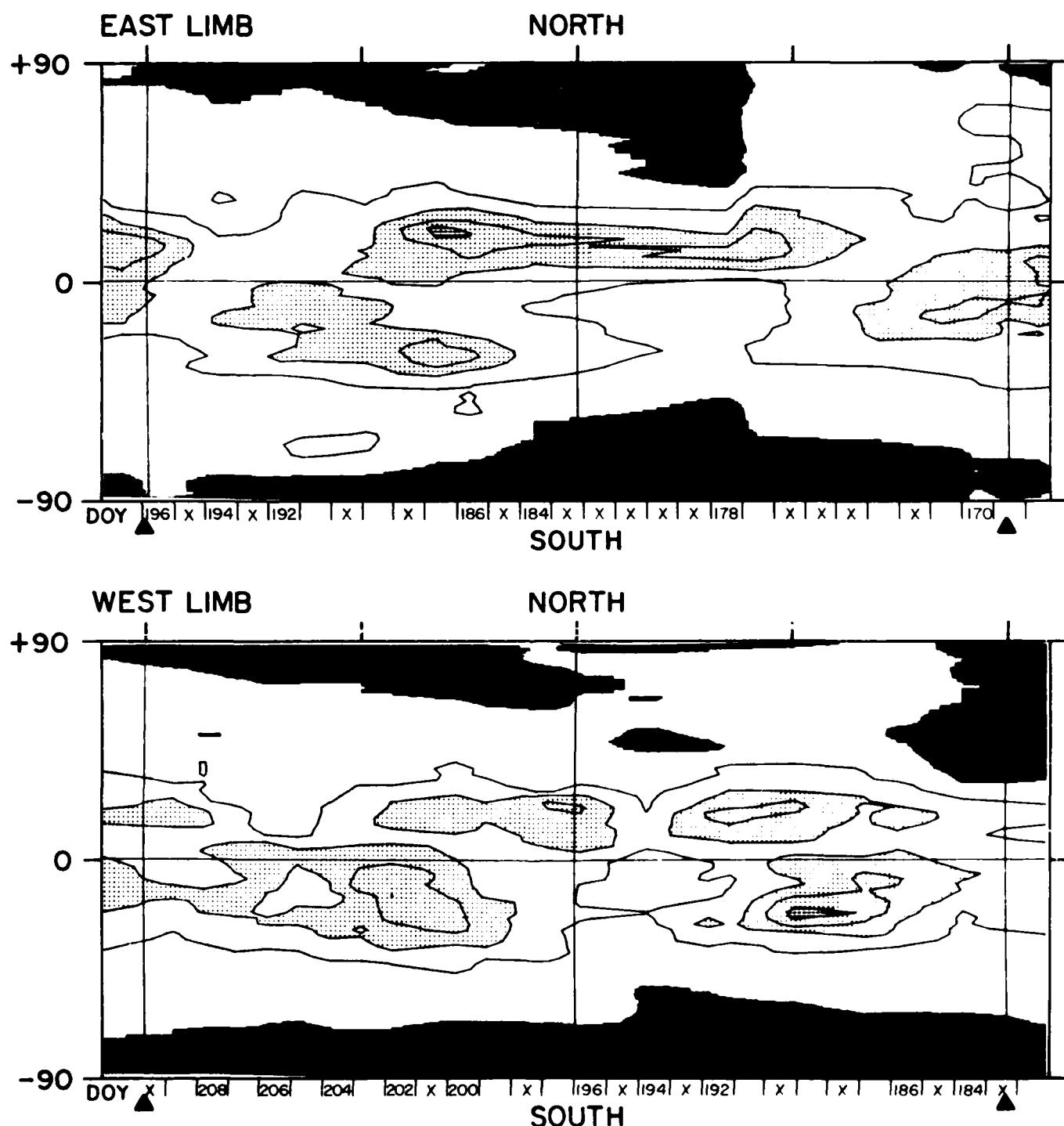
# NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1709 HEIGHT 1.15 R<sub>o</sub> YEAR 1981



X = NO DATA

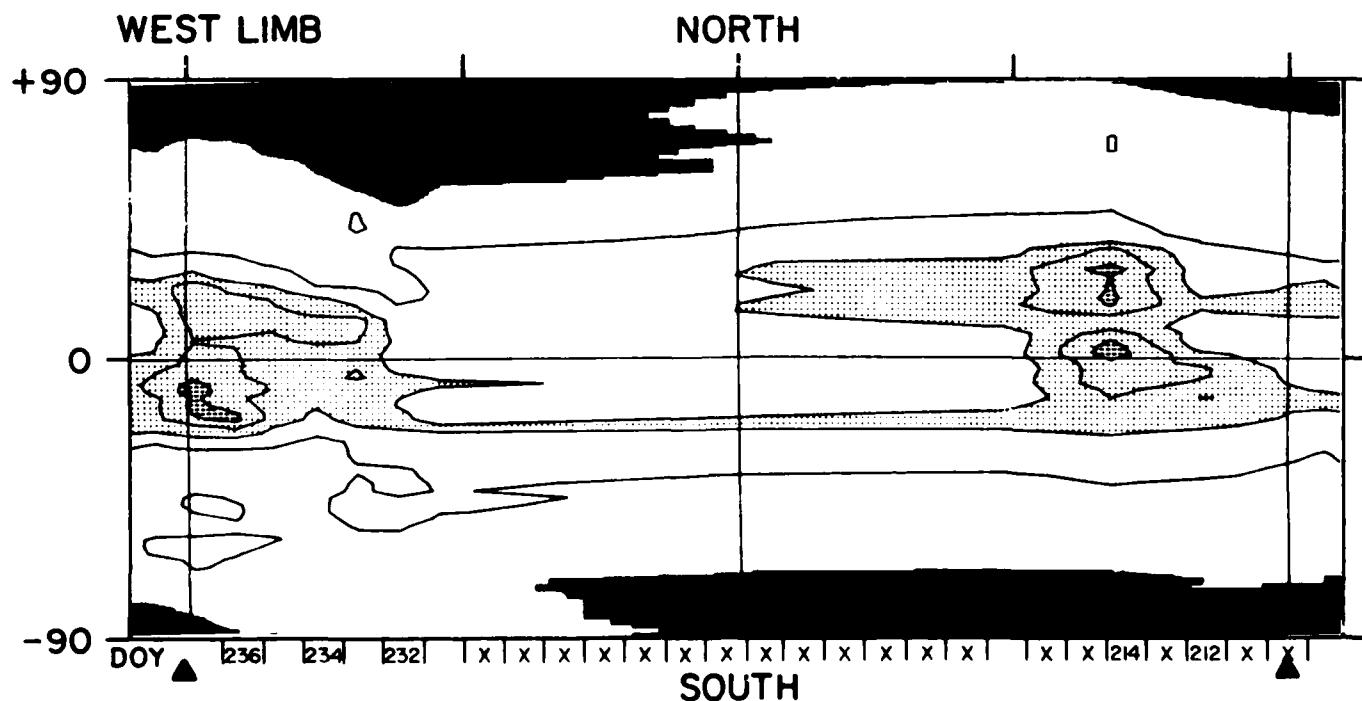
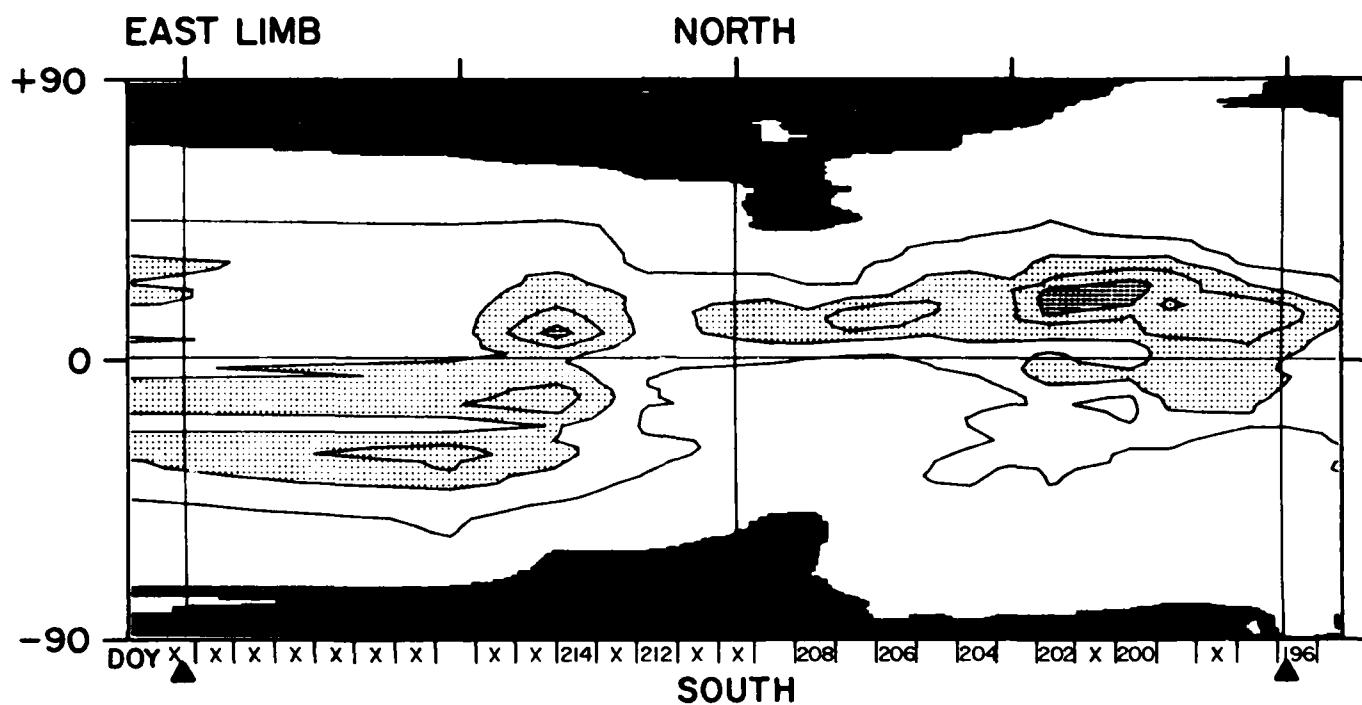
**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK****Fe XIV, 5303 Å CORONAL PHOTOMETER****ROTATION 1710    HEIGHT 1.15 R<sub>o</sub>    YEAR 1981**

X = NO DATA

# NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1711      HEIGHT 1.15 R<sub>⊕</sub>      YEAR 1981

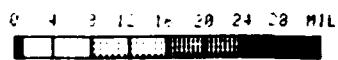
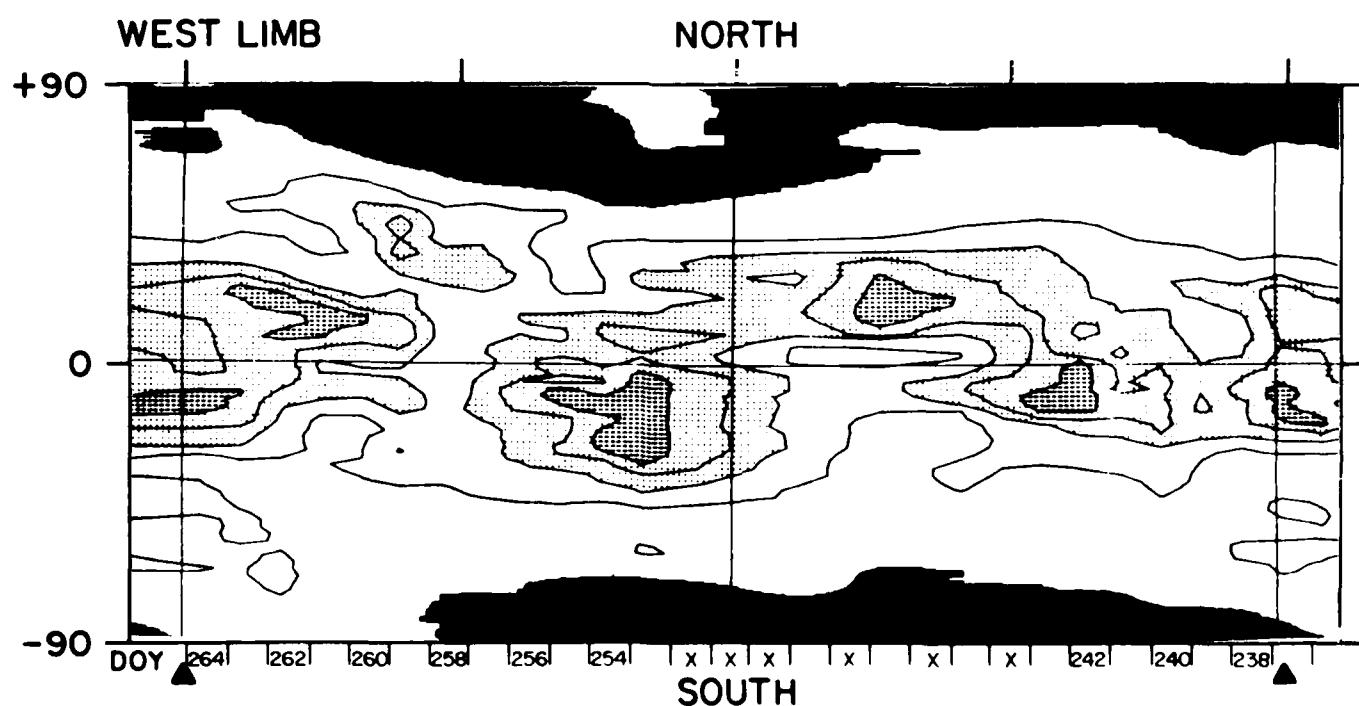
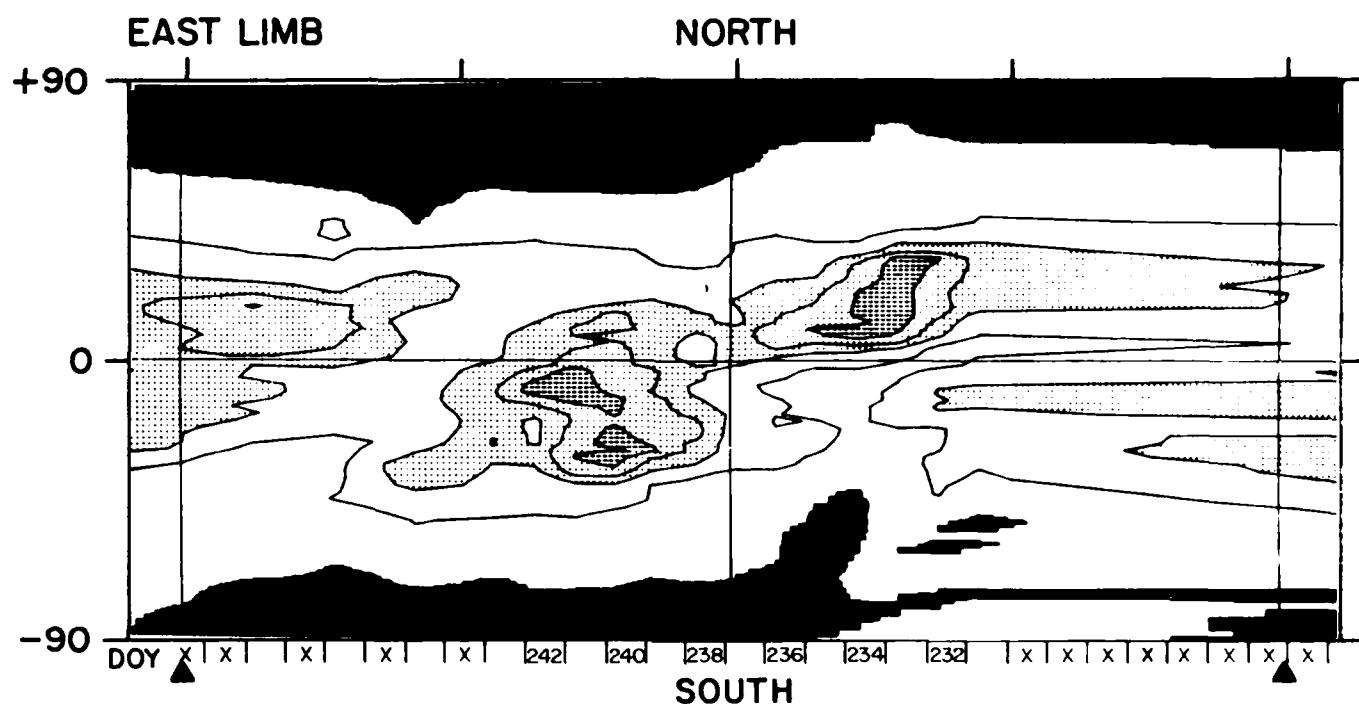


X = NO DATA

# NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1712 HEIGHT 1.15R<sub>•</sub> YEAR 1981



X = NO DATA

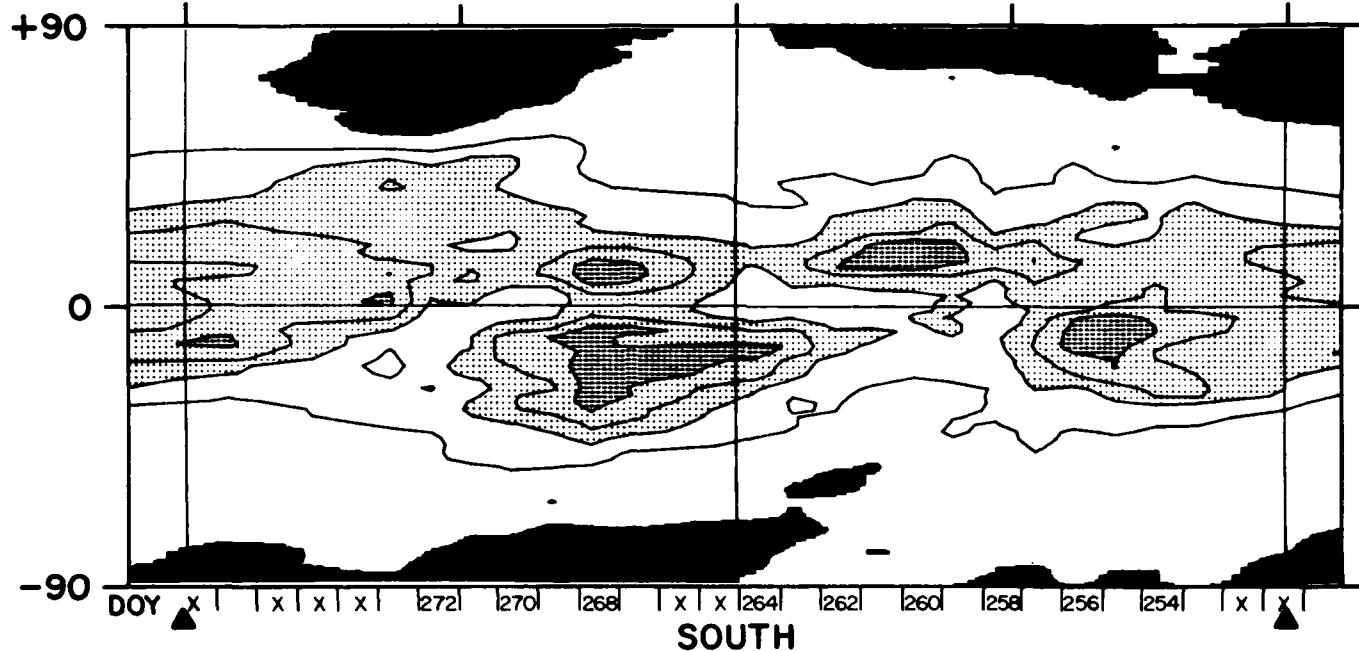
# NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1713    HEIGHT 1.15 R<sub>⊕</sub>    YEAR 1981

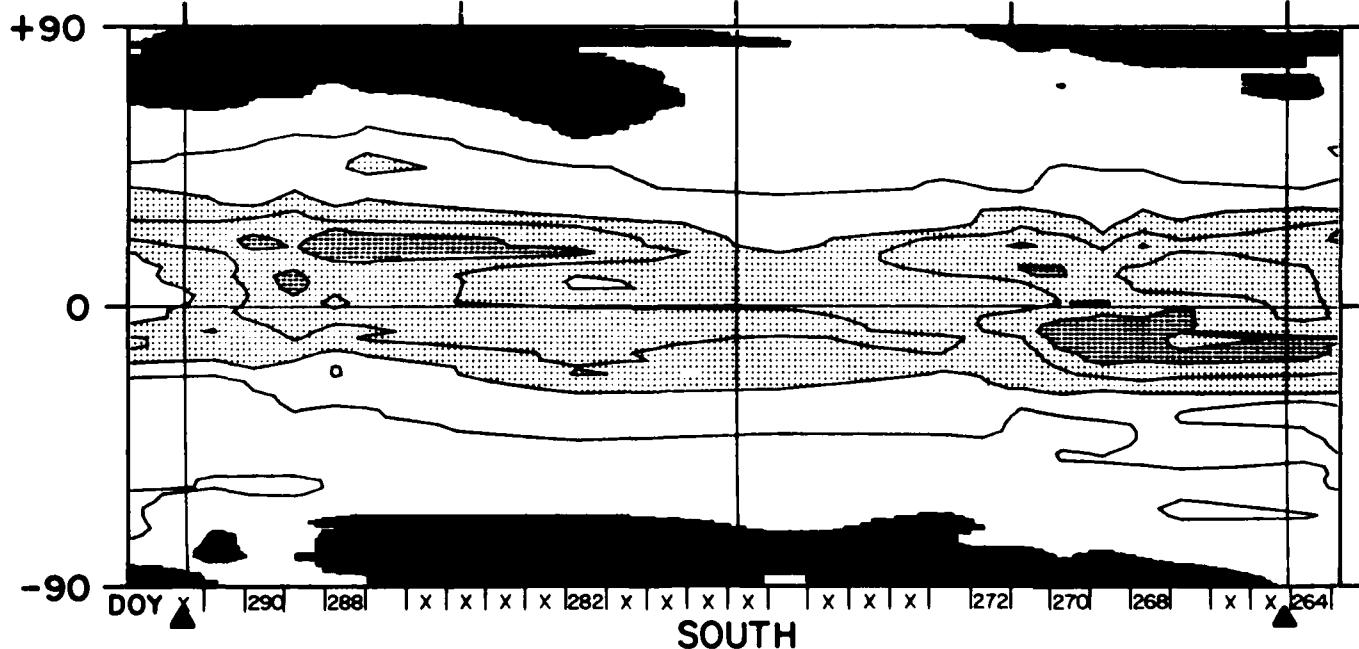
EAST LIMB

NORTH



WEST LIMB

NORTH

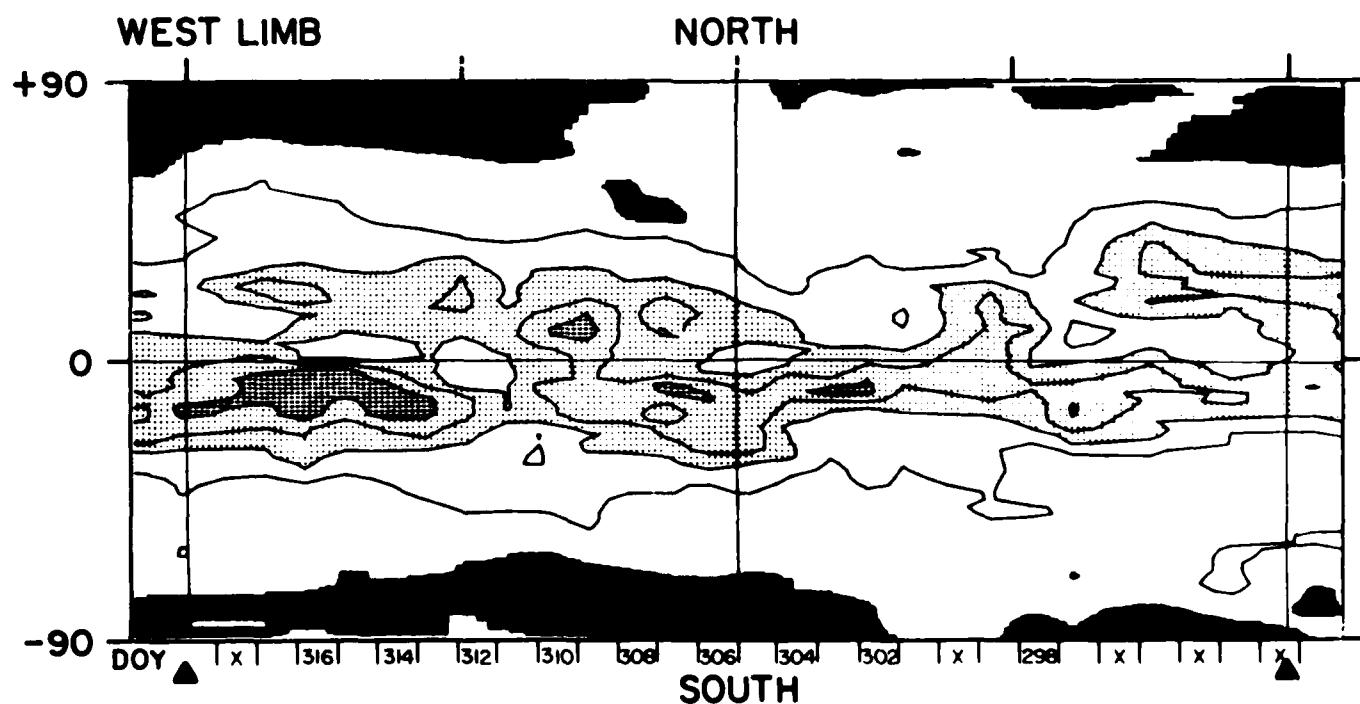
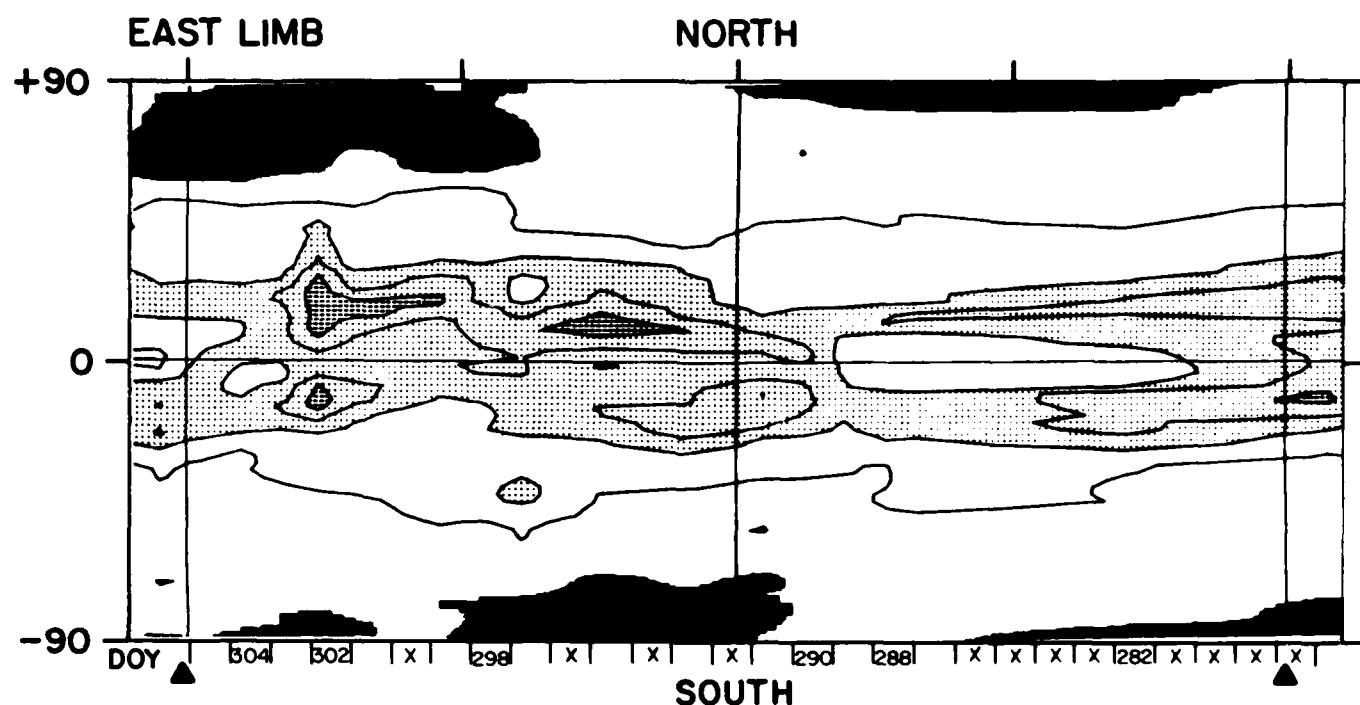


X = NO DATA

# NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1714    HEIGHT 1.15R<sub>•</sub>    YEAR 1981

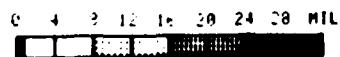
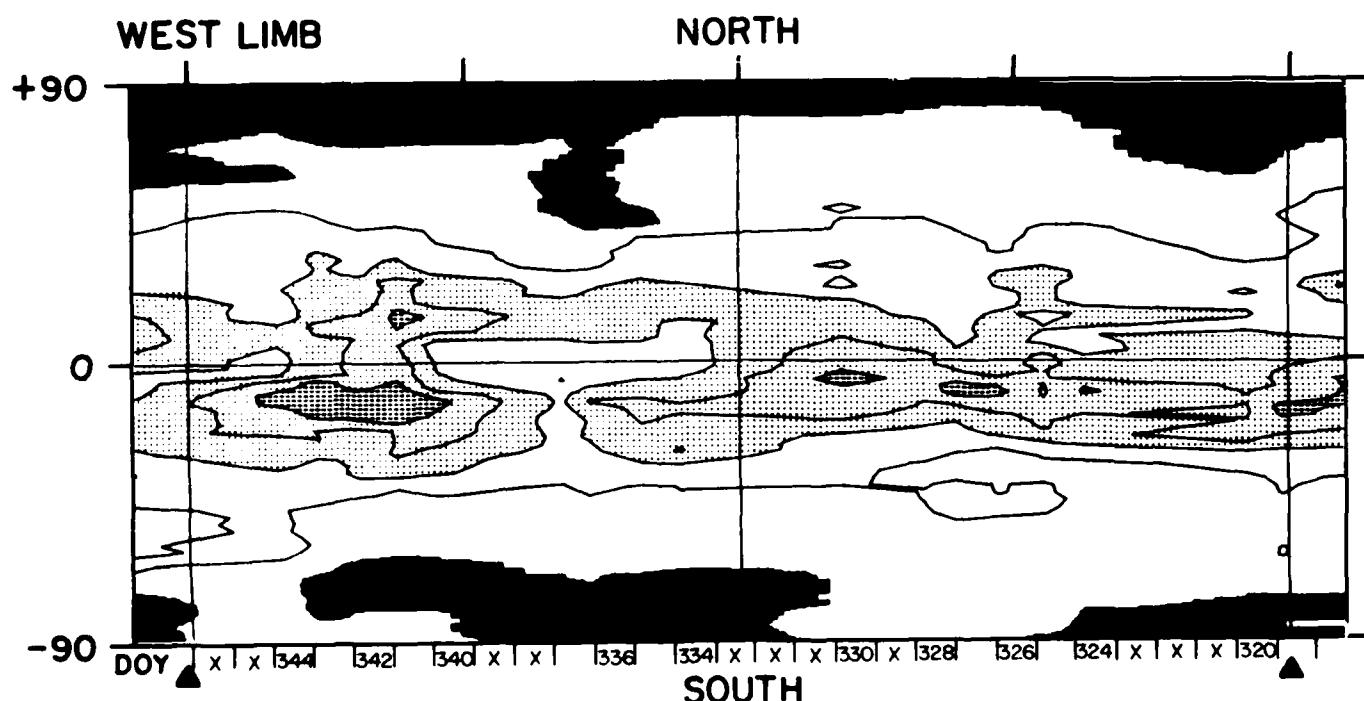
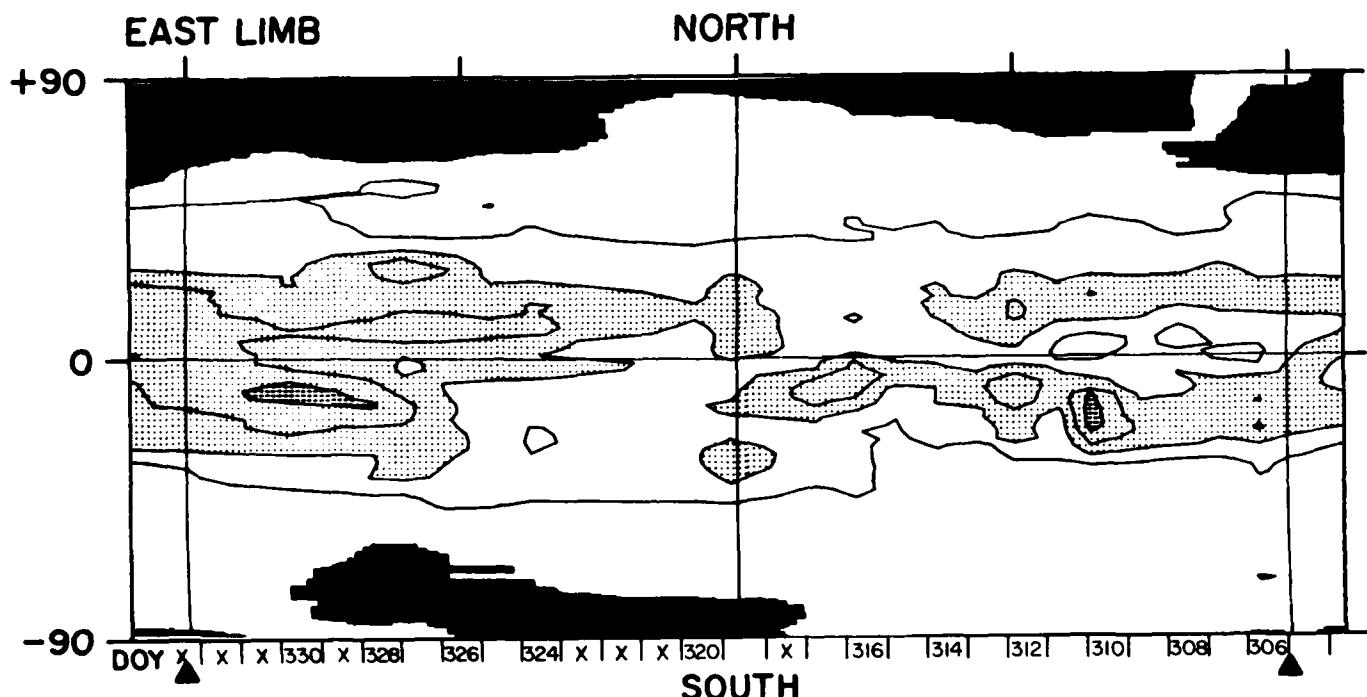


X = NO DATA

# NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1715    HEIGHT 1.15R<sub>o</sub>    YEAR 1981

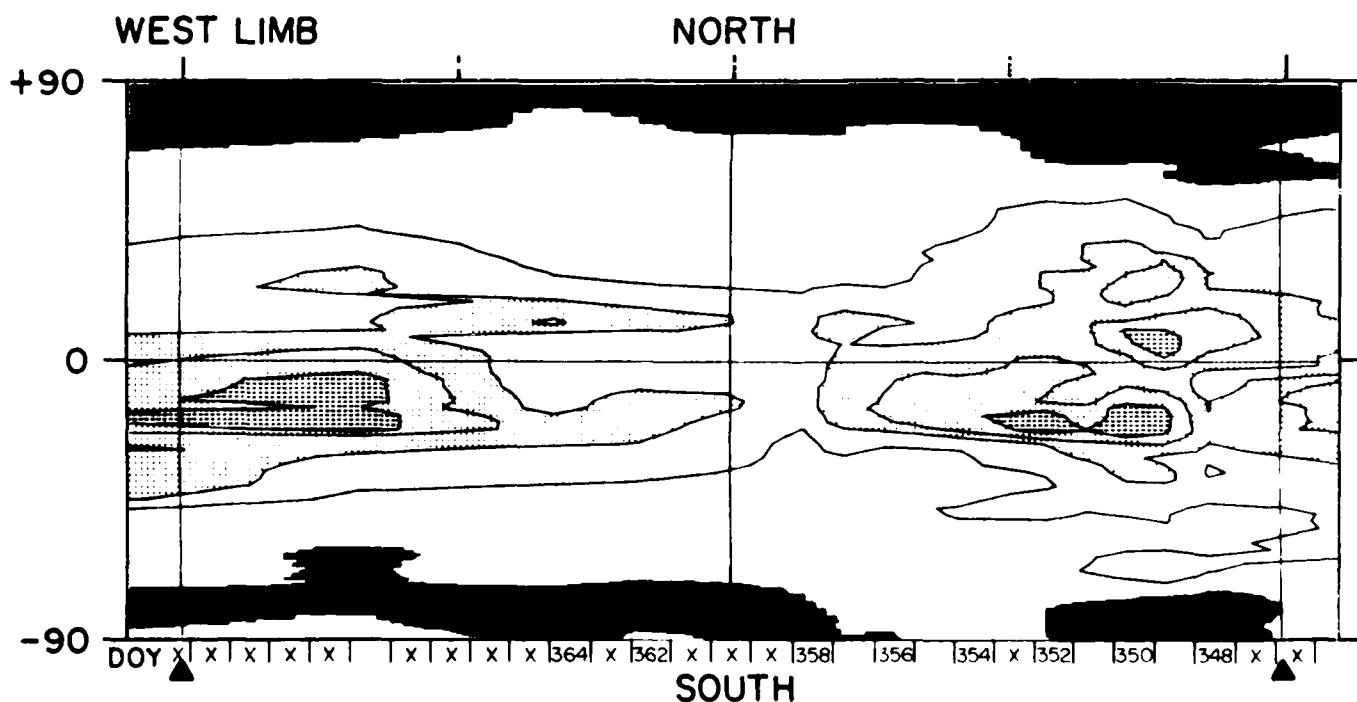
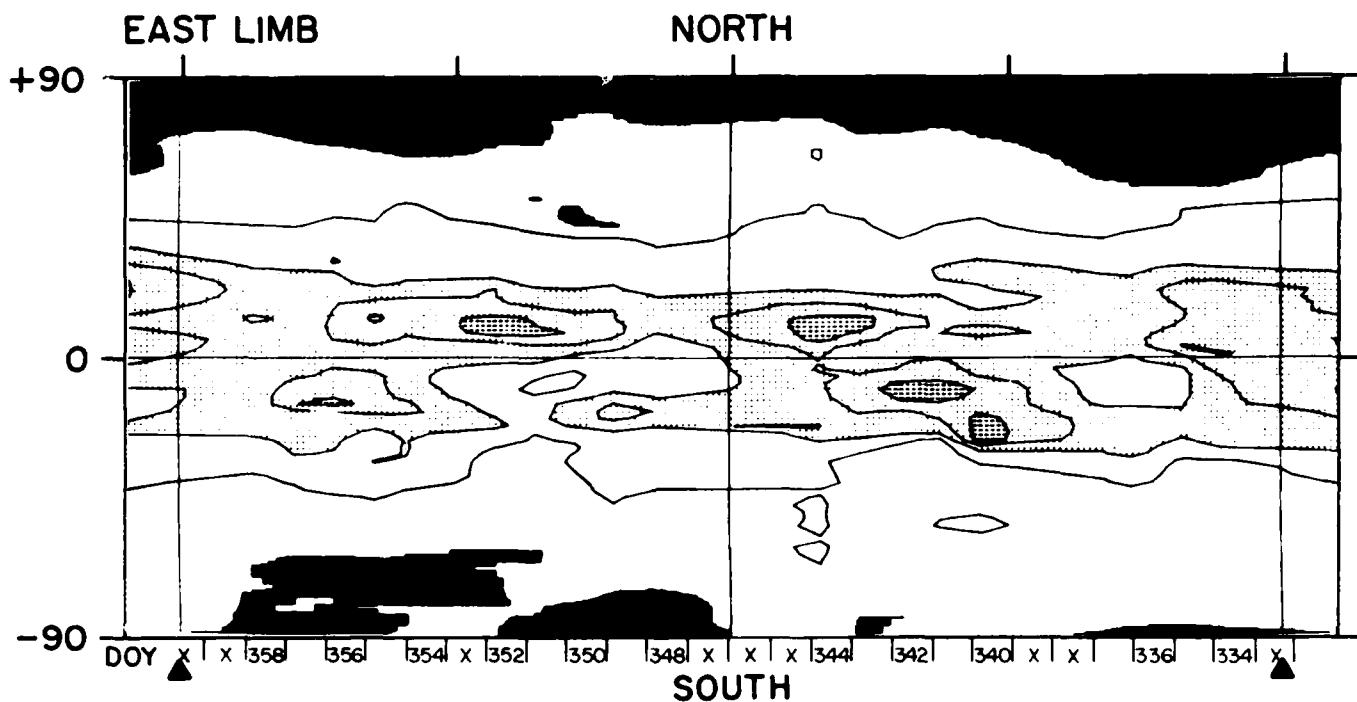


X = NO DATA

# NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1716 HEIGHT 1.15 R<sub>o</sub> YEAR 1981



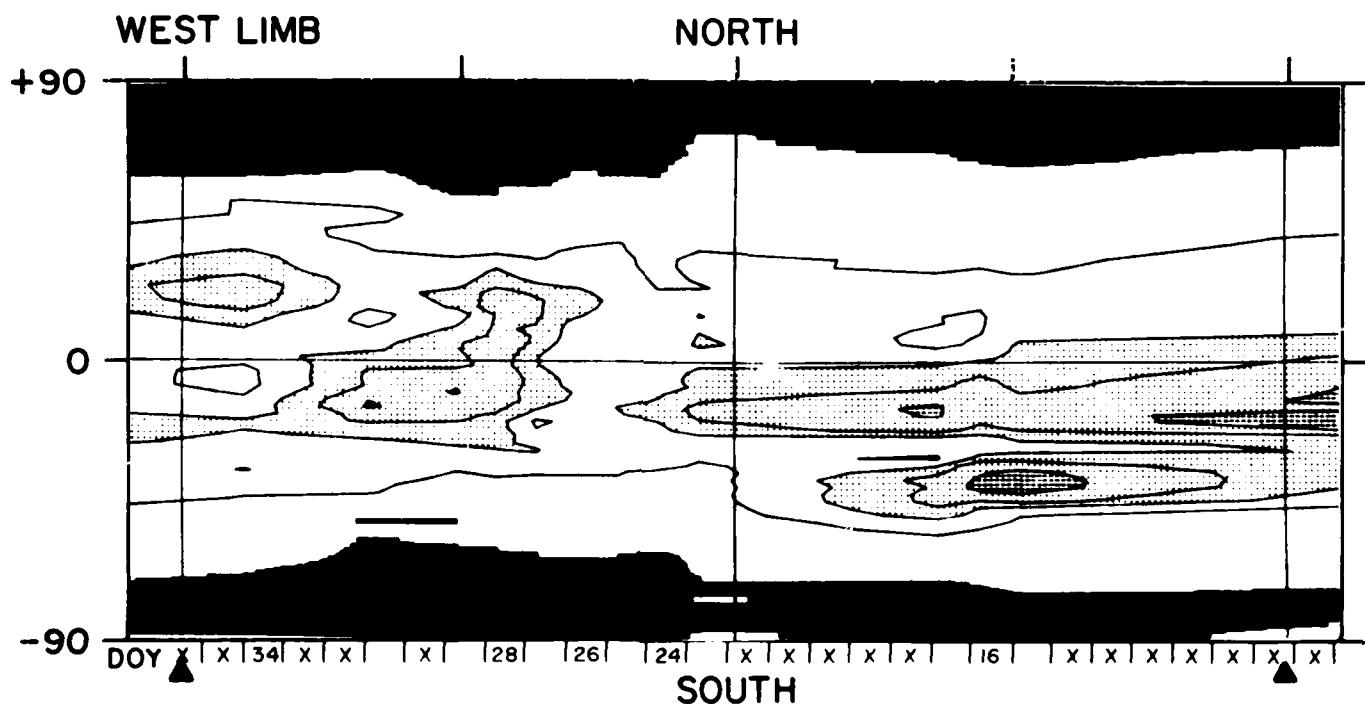
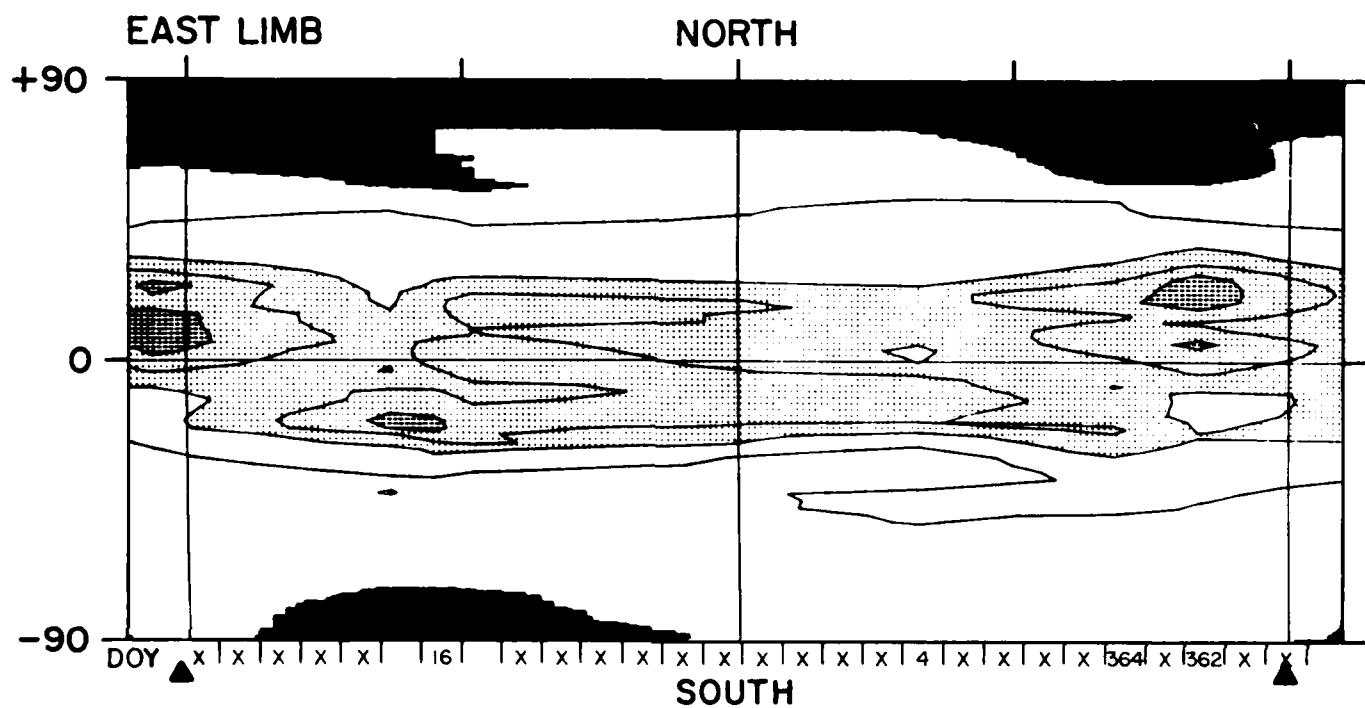
0 4 8 12 16 20 24 28 MIL

X = NO DATA

NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1717 HEIGHT 1.15 R<sub>⊕</sub> YEAR 1982

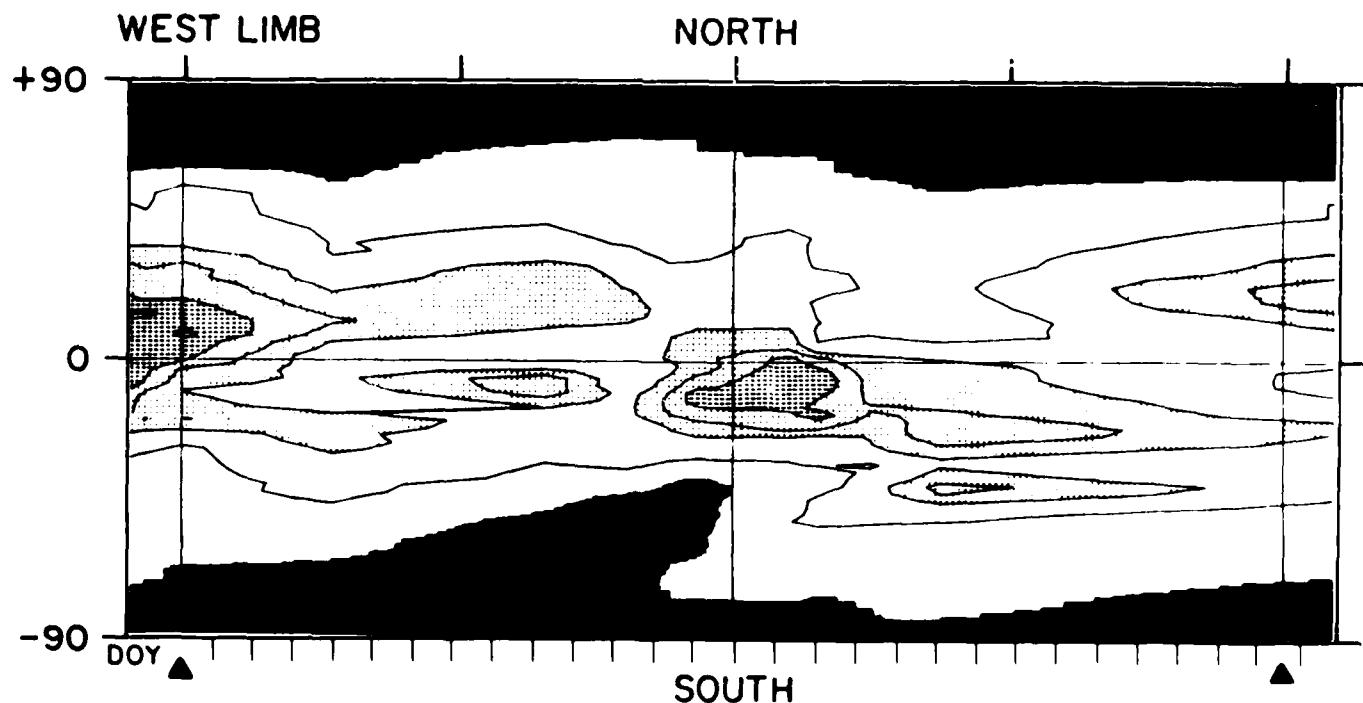
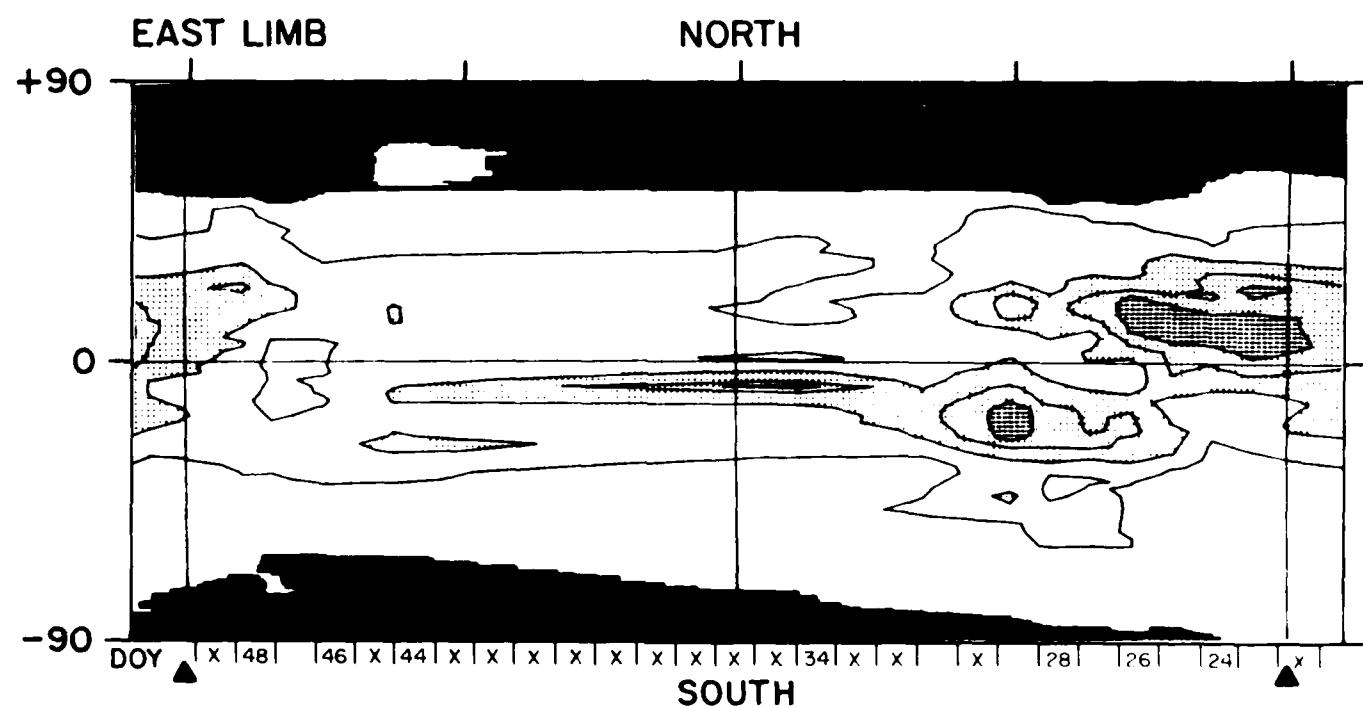


X = NO DATA

# NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1718 HEIGHT 1.15 R<sub>o</sub> YEAR 1982

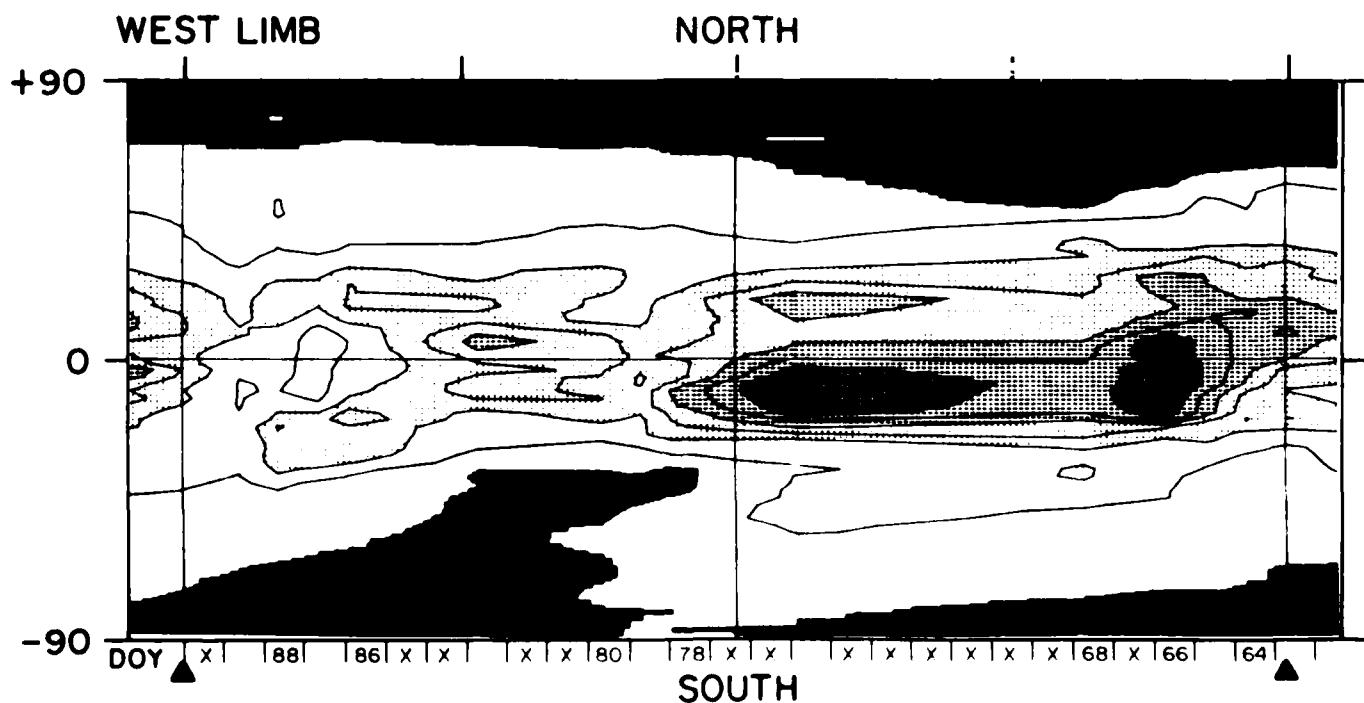
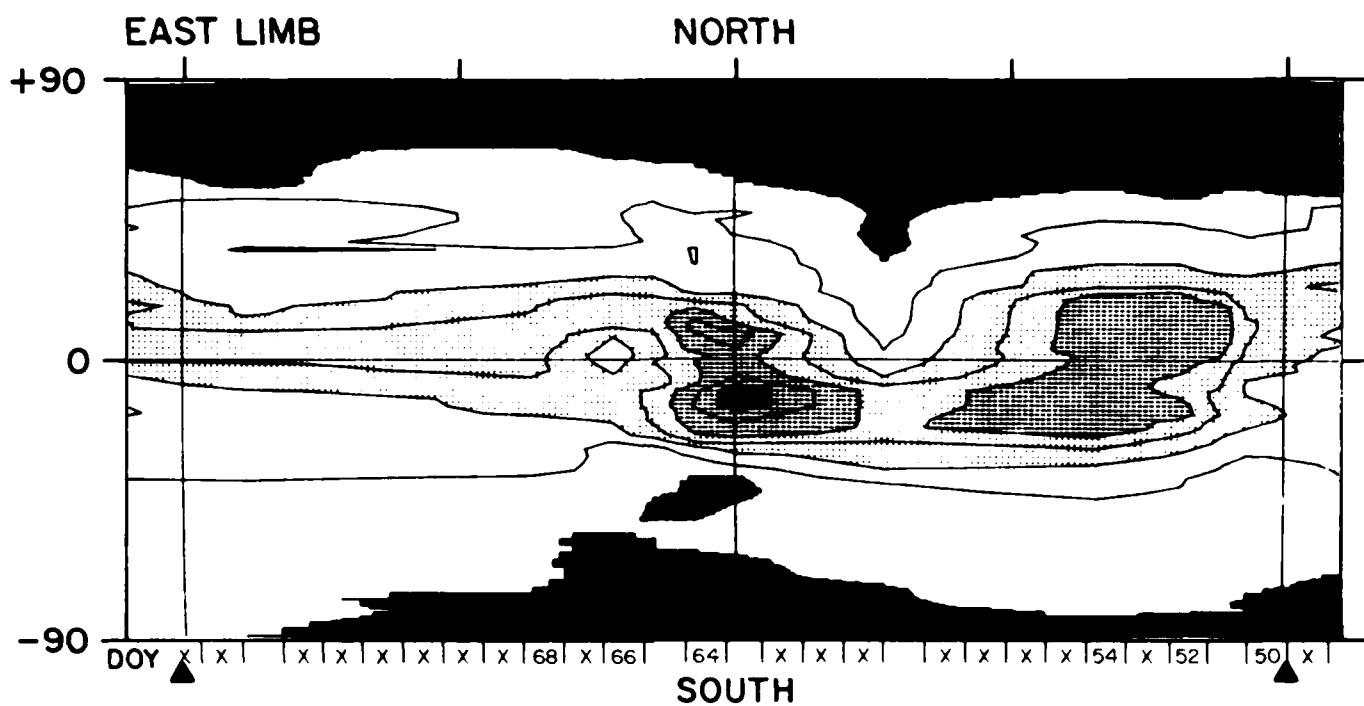


X = NO DATA

NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1719    HEIGHT 1.15 R<sub>⊕</sub>    YEAR 1982

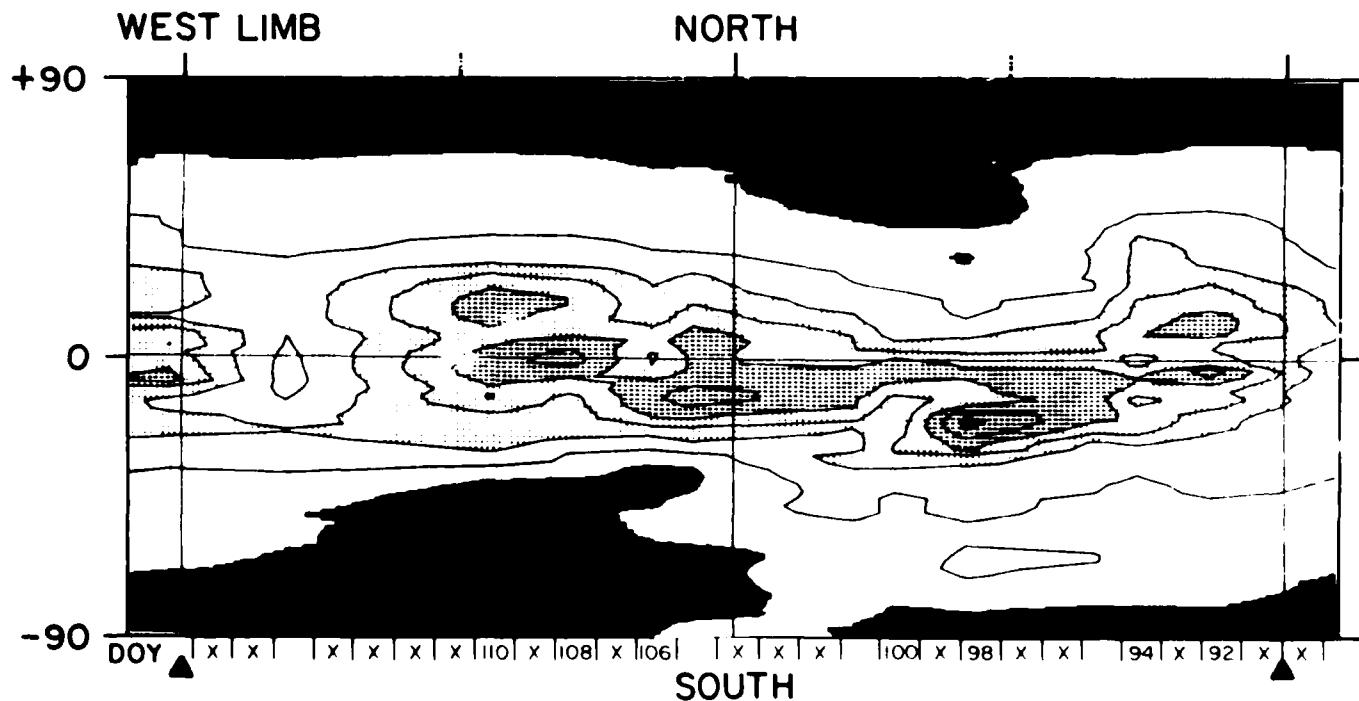
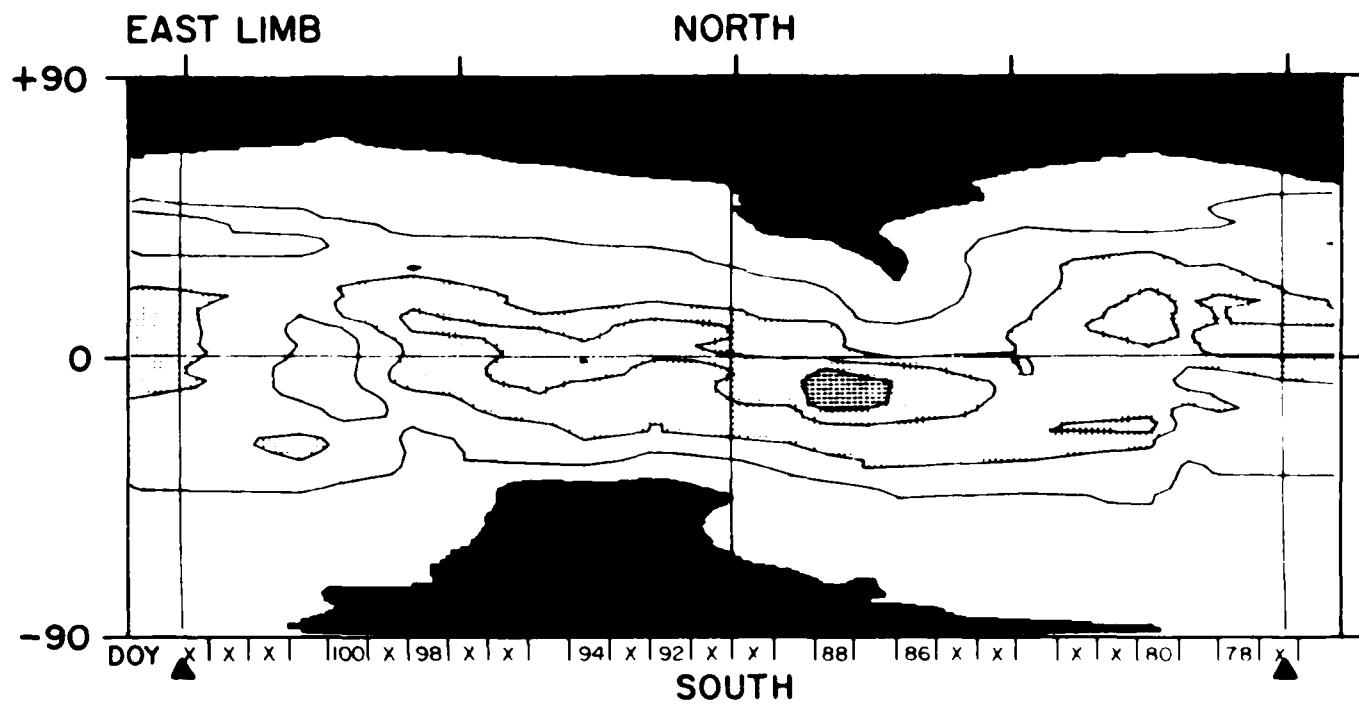


X = NO DATA

NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1720 HEIGHT 1.15 R<sub>sun</sub> YEAR 1982



X = NO DATA

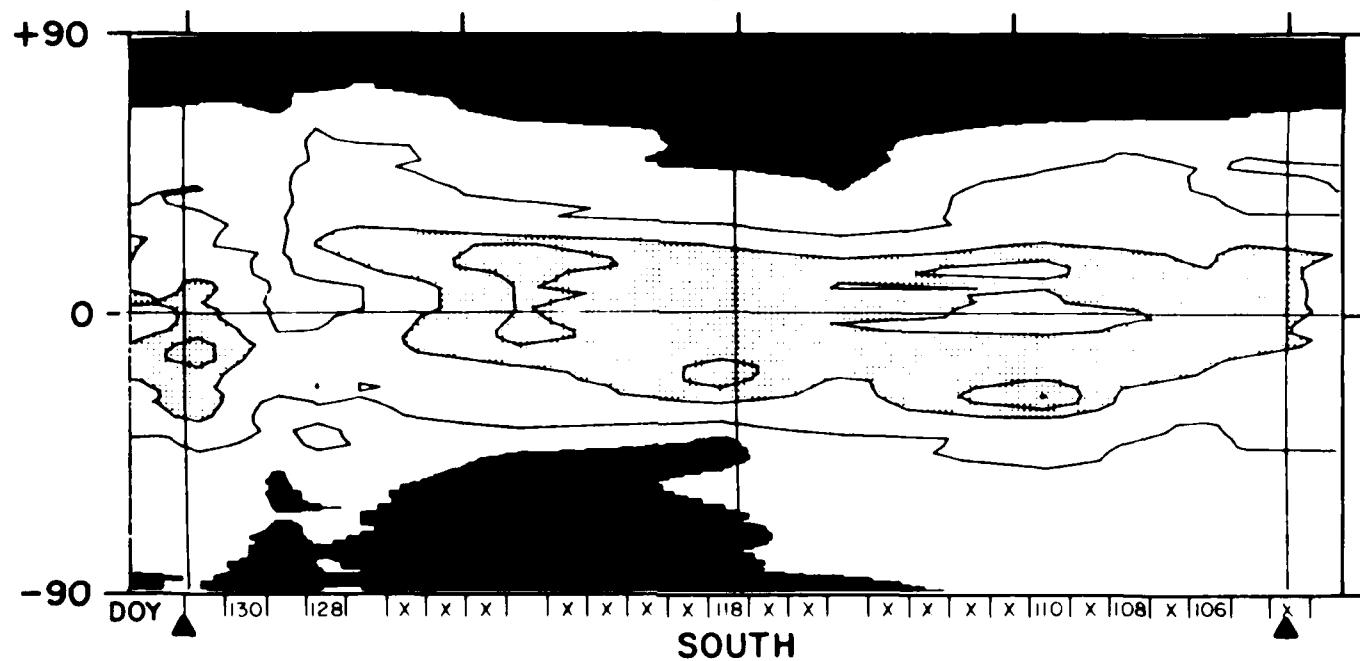
NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1721 HEIGHT 1.15 R<sub>o</sub> YEAR 1982

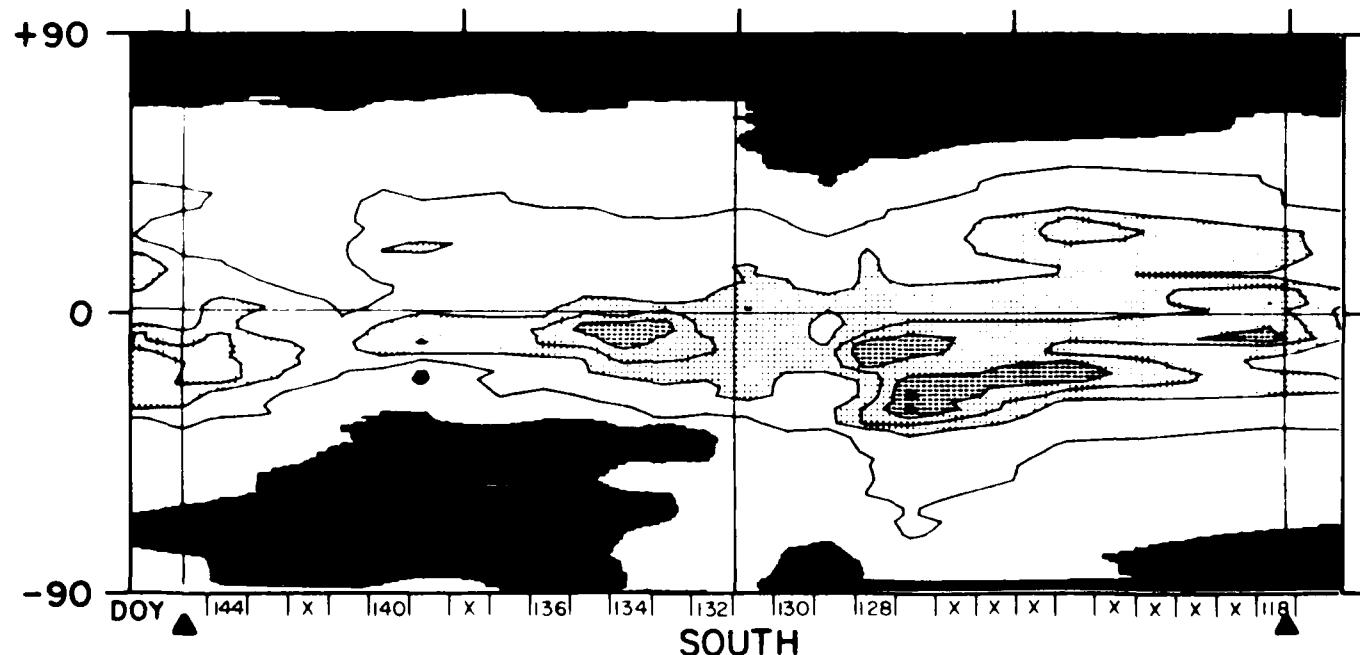
EAST LIMB

NORTH



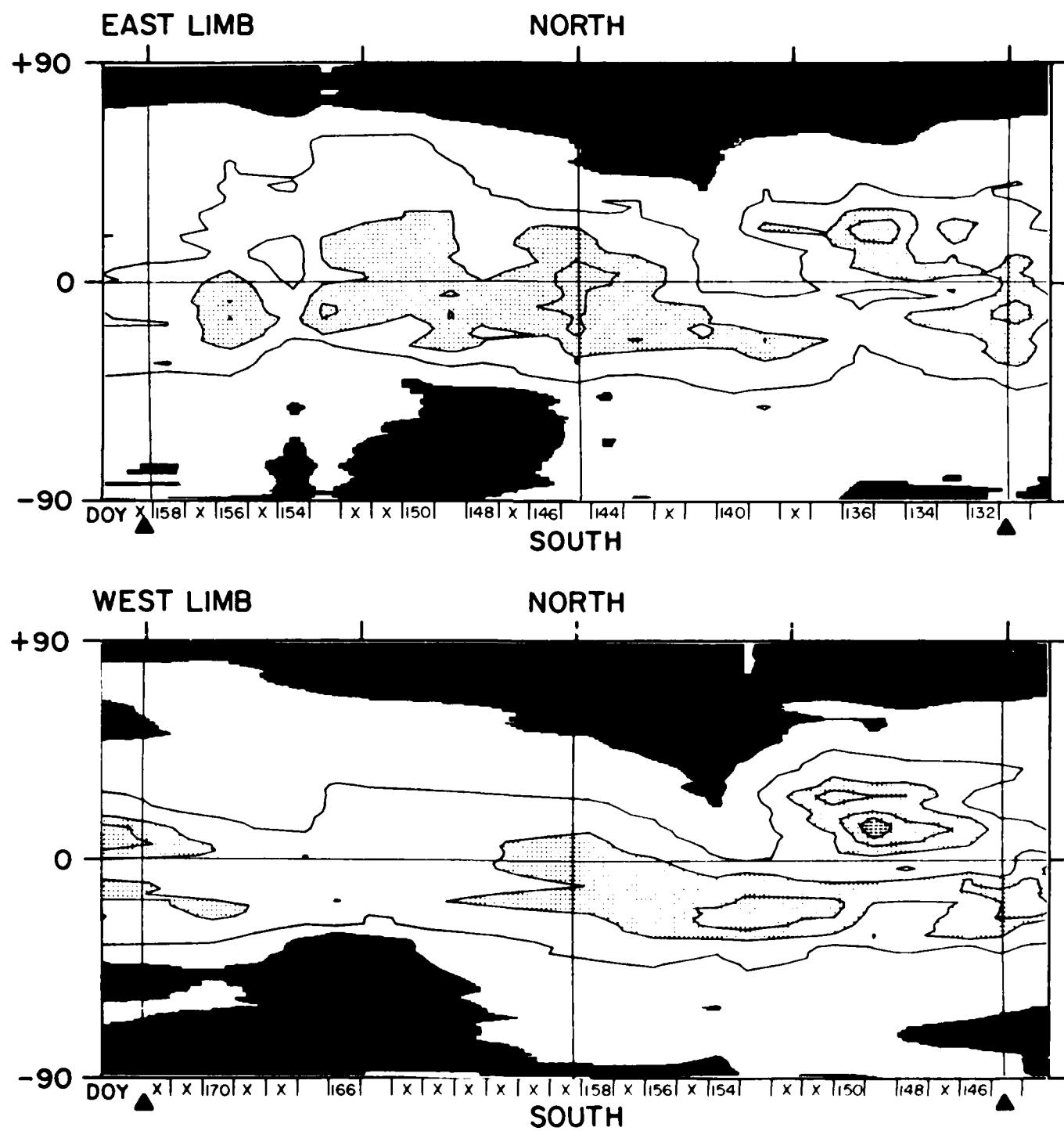
WEST LIMB

NORTH



X = NO DATA

NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK  
 Fe XIV, 5303 Å CORONAL PHOTOMETER  
 ROTATION 1722 HEIGHT 1.15R<sub>o</sub> YEAR 1982



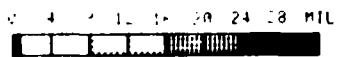
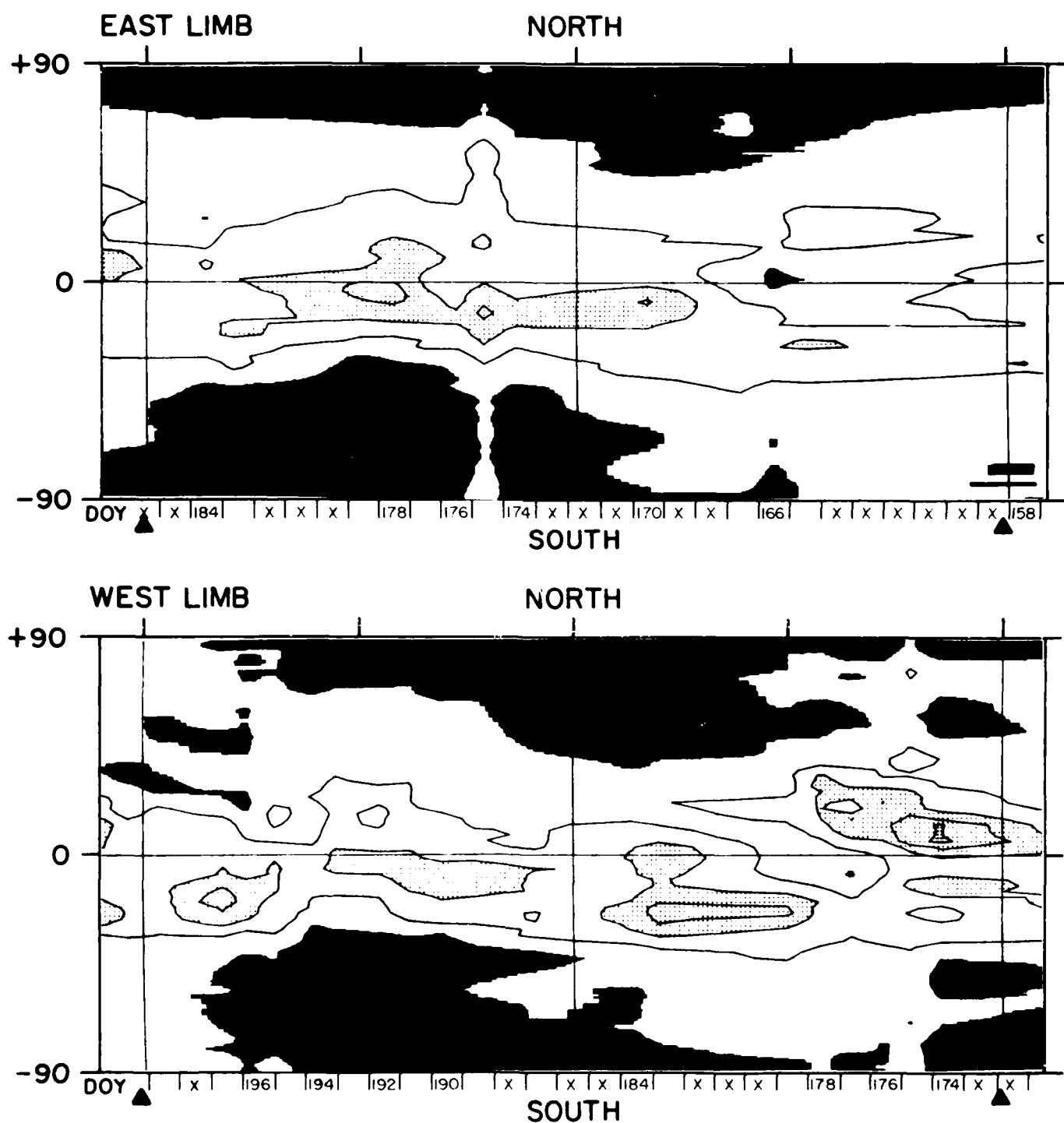
0 4 8 12 16 20 24 28 MIL

X = NO DATA

# NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1723 HEIGHT 1.15 R<sub>⊕</sub> YEAR 1982

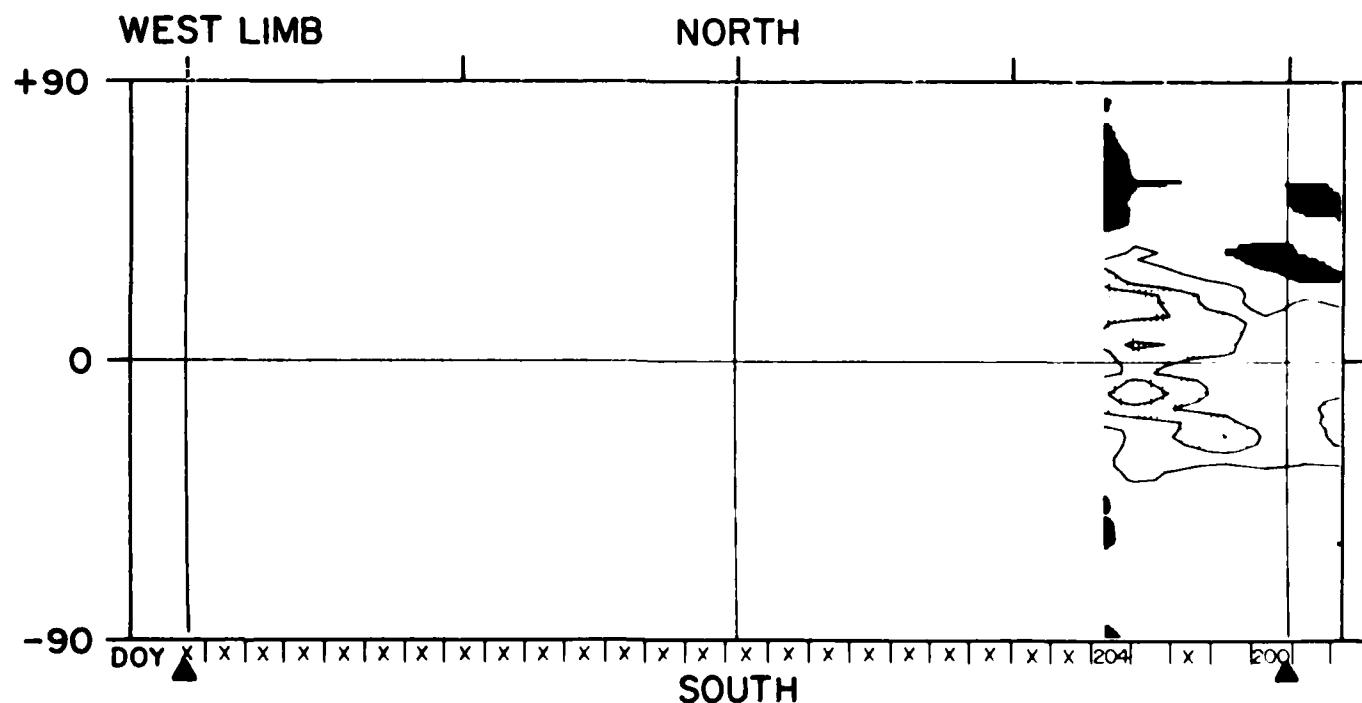
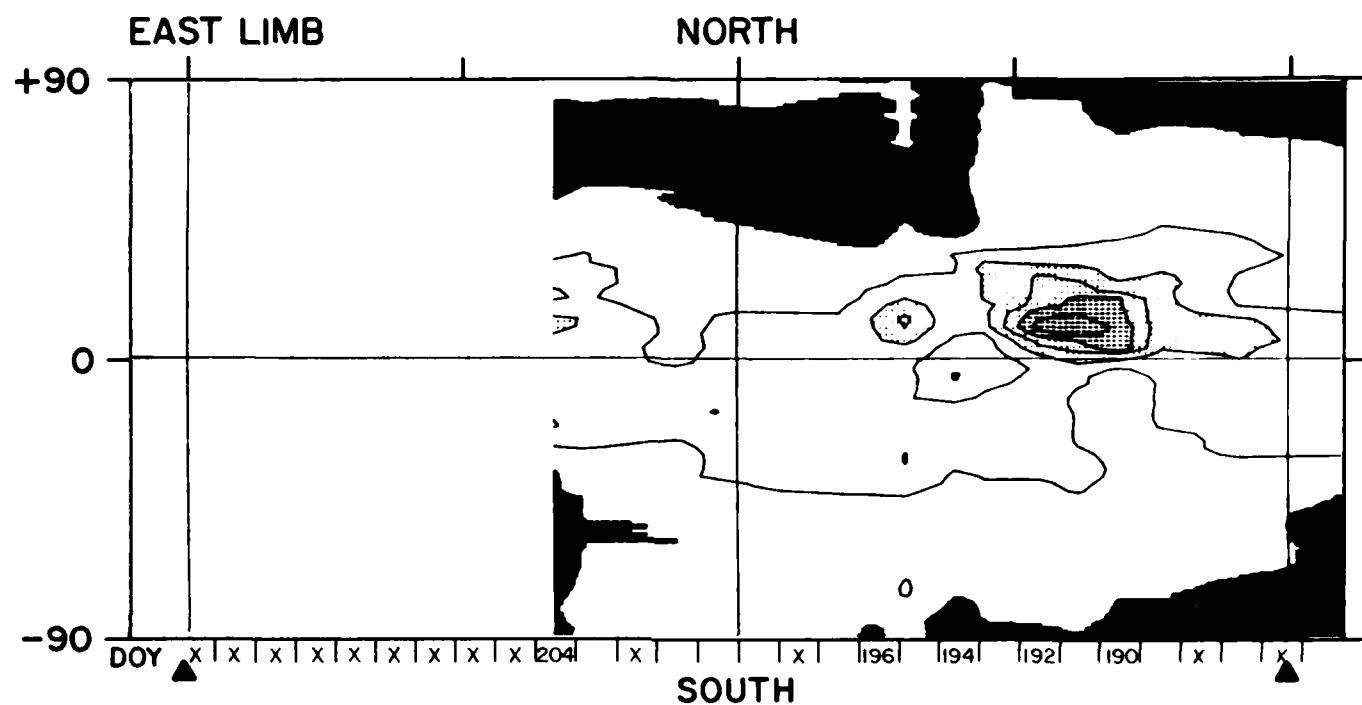


X = NO DATA

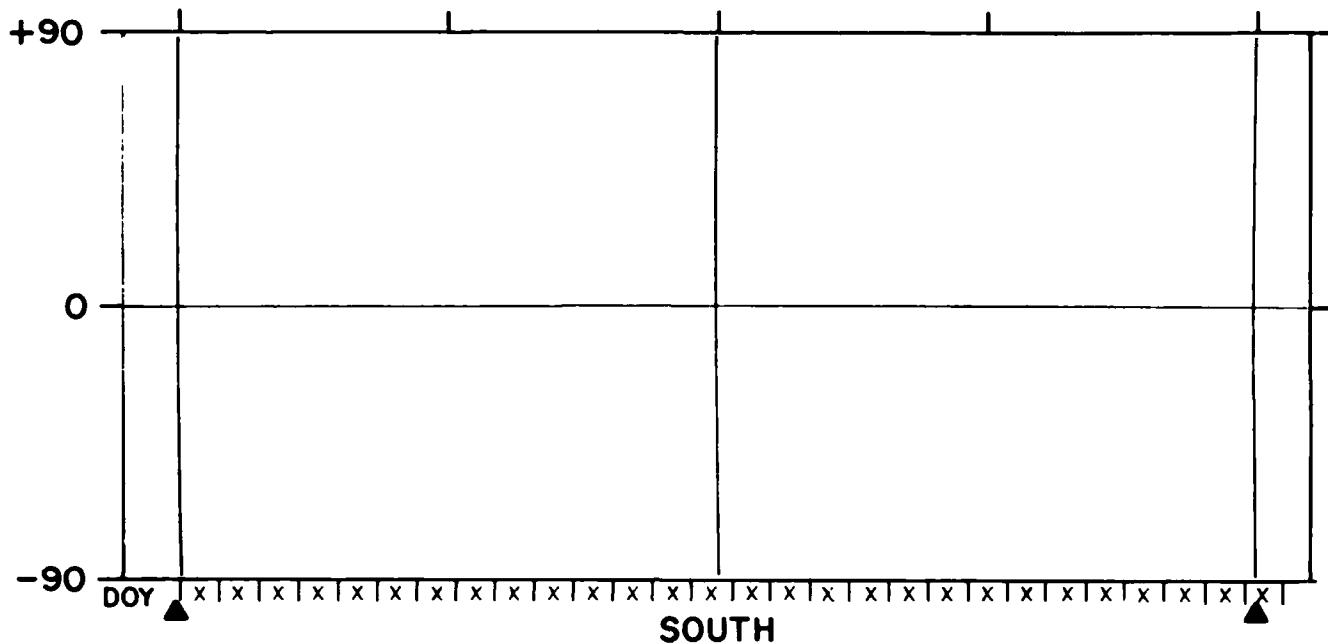
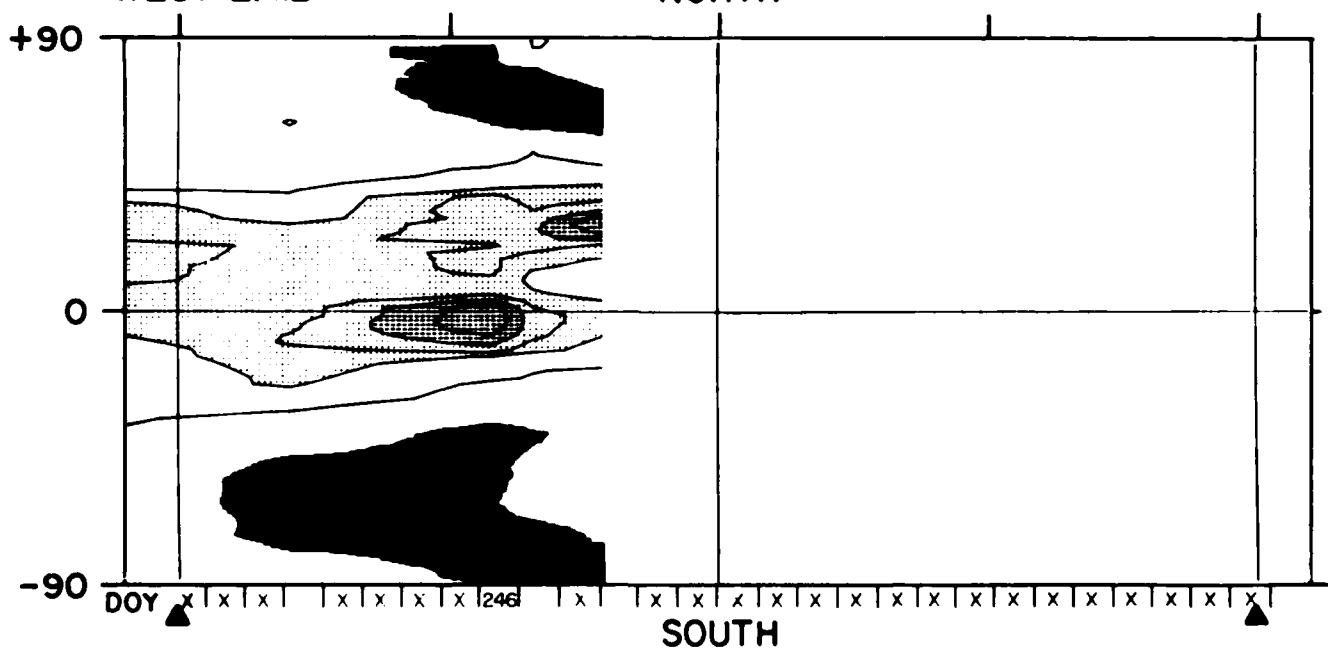
# NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1724 HEIGHT 1.15 R<sub>o</sub> YEAR 1982



X = NO DATA

**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK****Fe XIV, 5303 Å CORONAL PHOTOMETER****ROTATION 1725 HEIGHT 1.15 R<sub>⊕</sub> YEAR 1982****EAST LIMB****NORTH****SOUTH****WEST LIMB****NORTH****SOUTH**

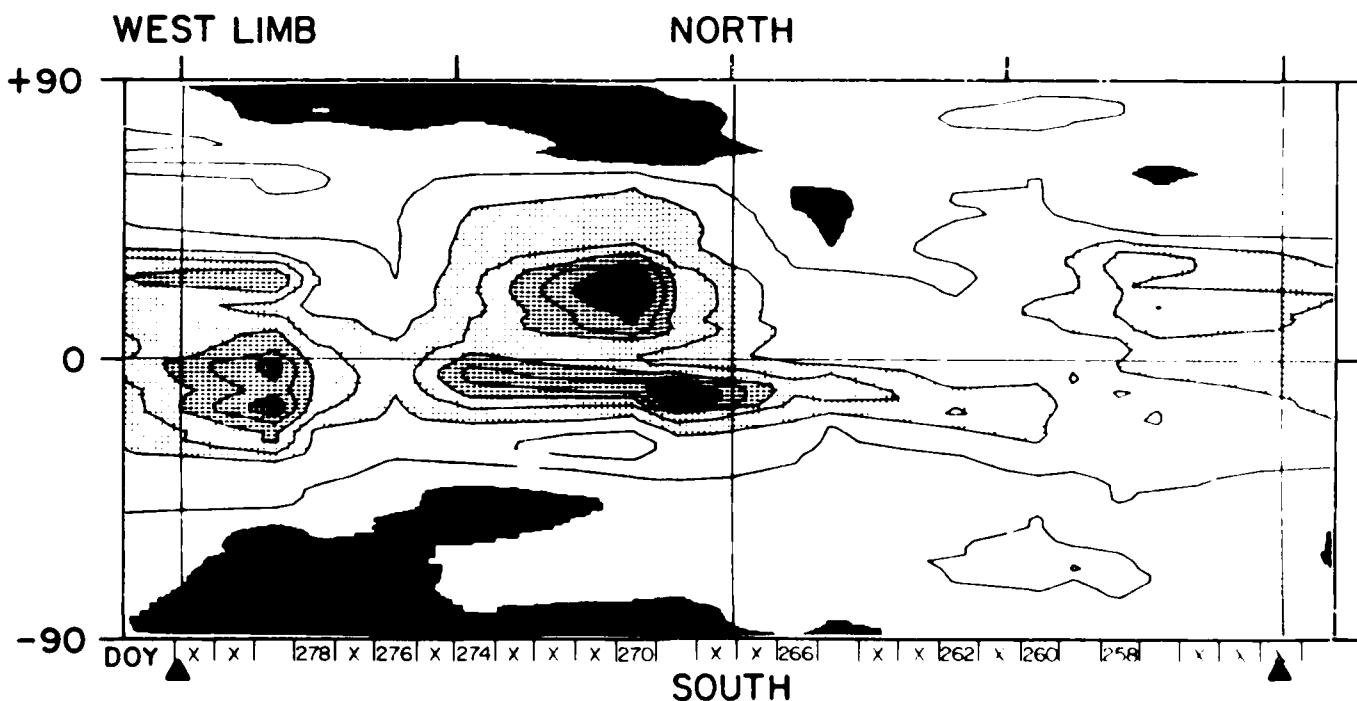
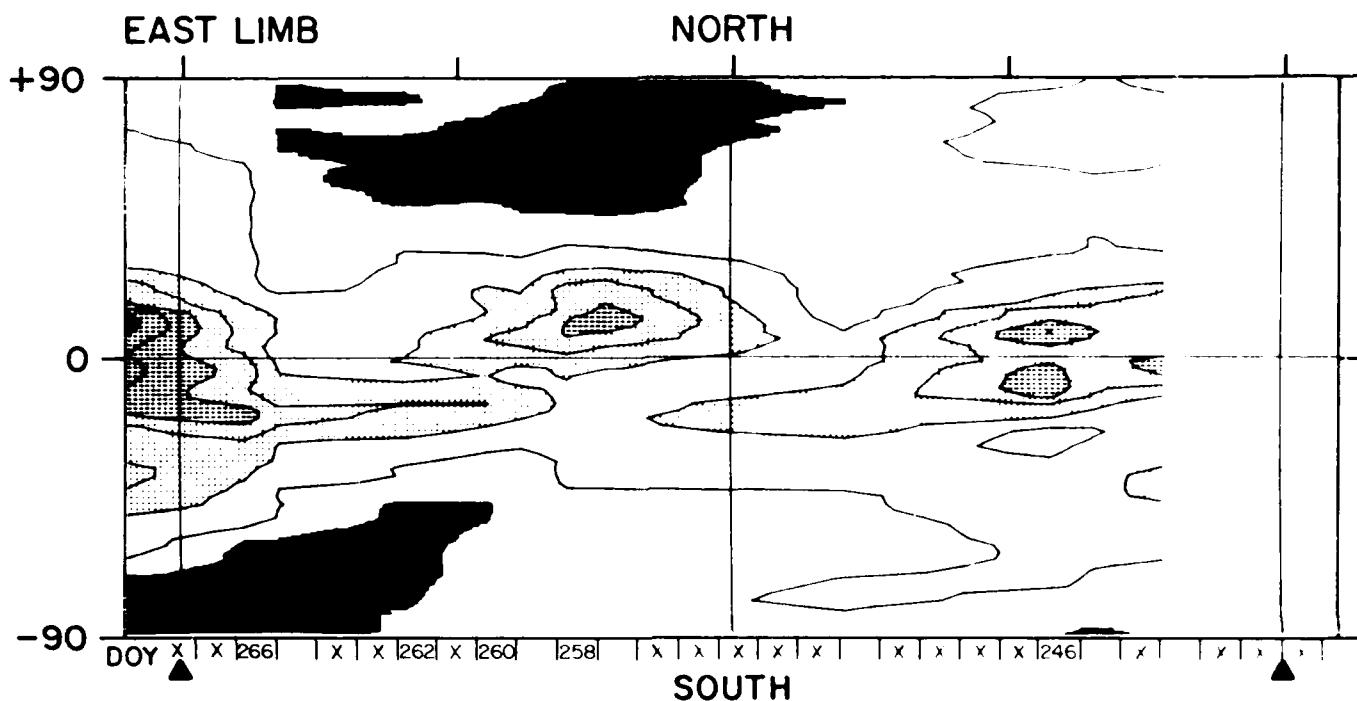
0 4 8 12 16 20 24 28 MIL

**X = NO DATA**

NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

## Fe XIV, 5303Å CORONAL PHOTOMETER

ROTATION 1726 HEIGHT 1.15 R<sub>⊕</sub> YEAR 1982

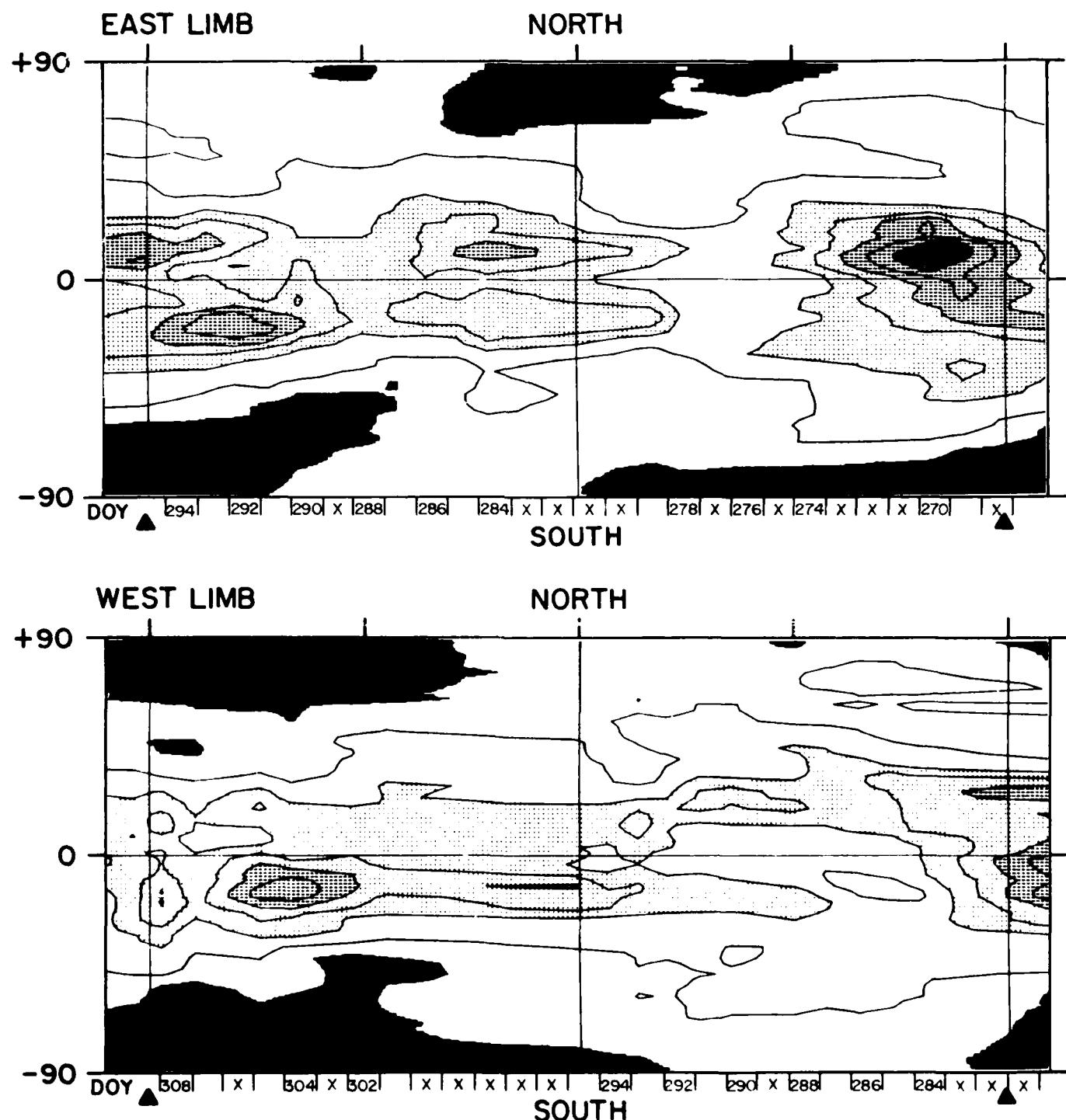


X = NO DATA

**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK**

**Fe XIV, 5303 Å CORONAL PHOTOMETER**

**ROTATION 1727 HEIGHT 1.15 R<sub>o</sub> YEAR 1982**



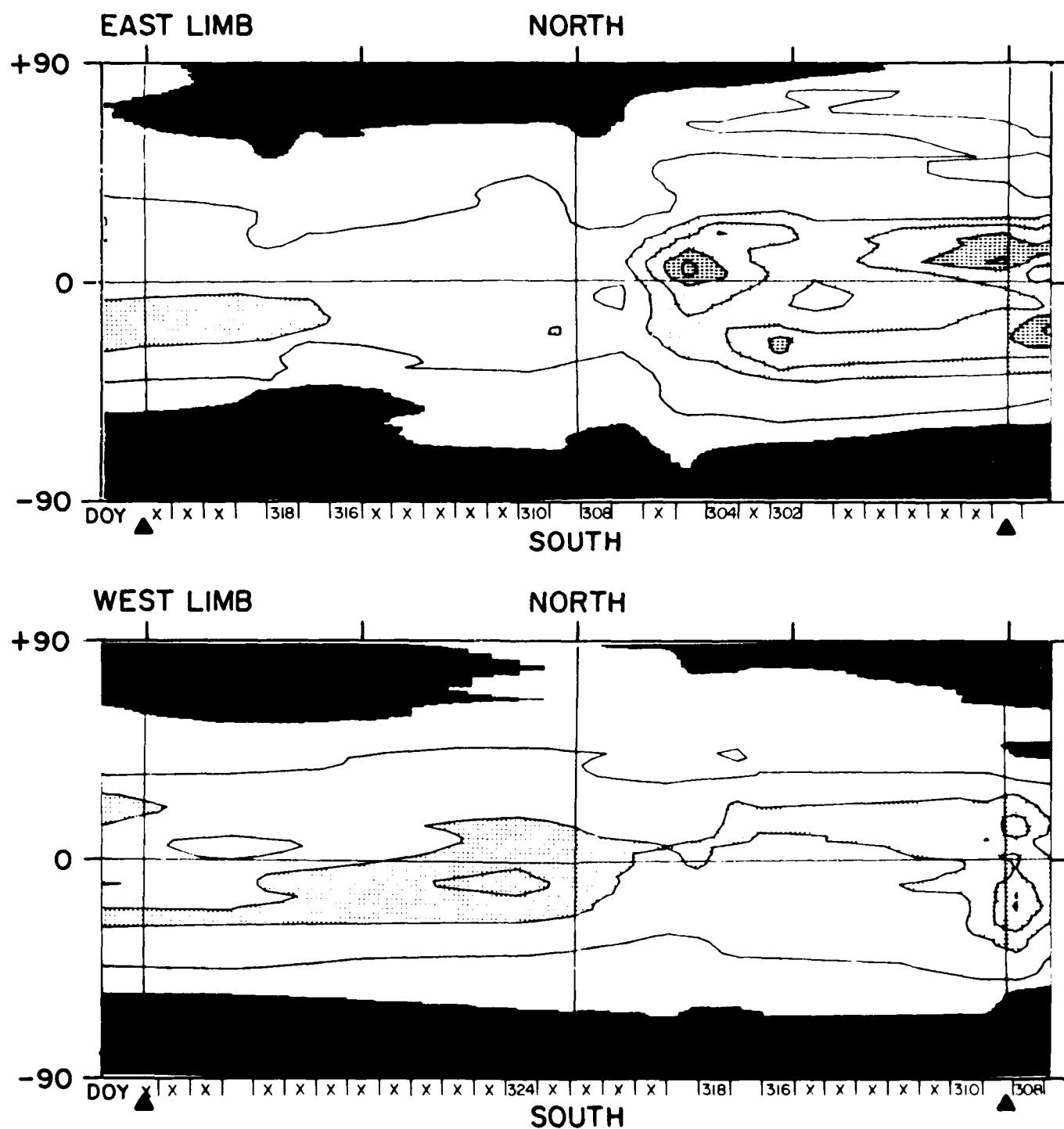
0 4 8 12 16 20 24 28 MIL

X = NO DATA

NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1728 HEIGHT 1.15R<sub>o</sub> YEAR 1982



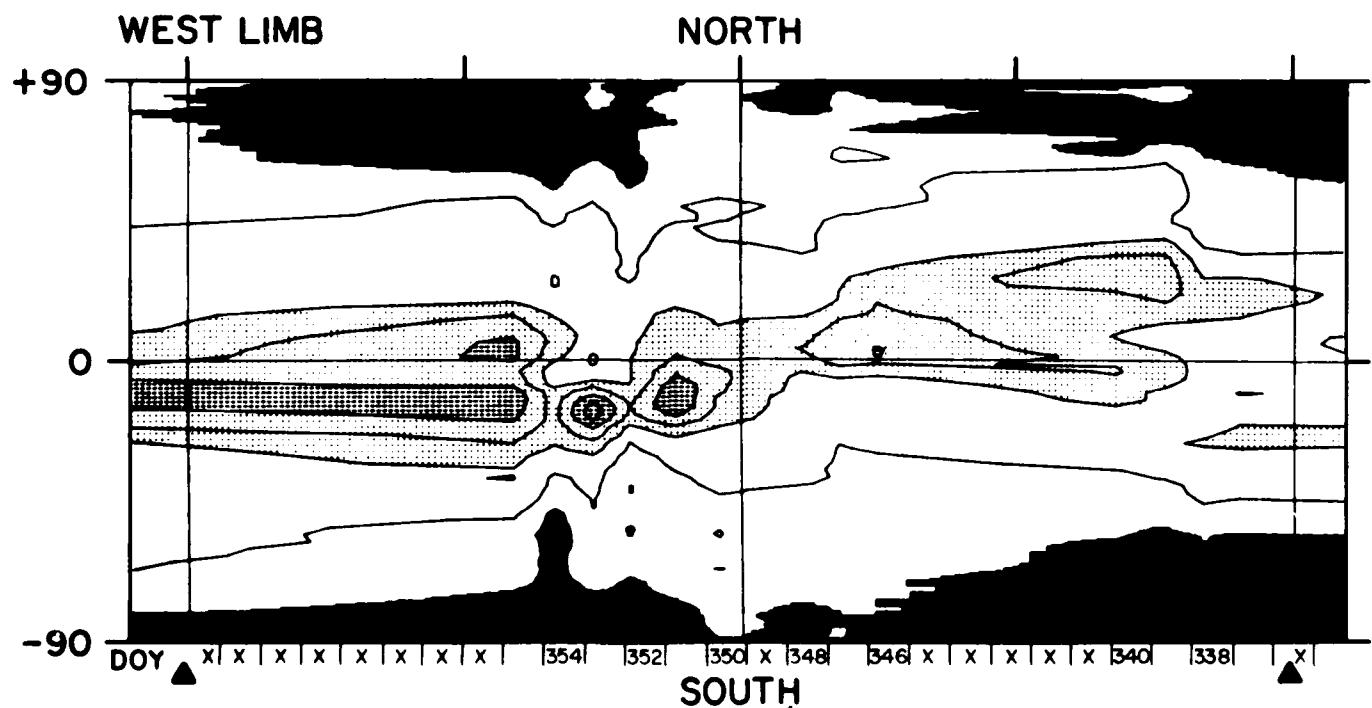
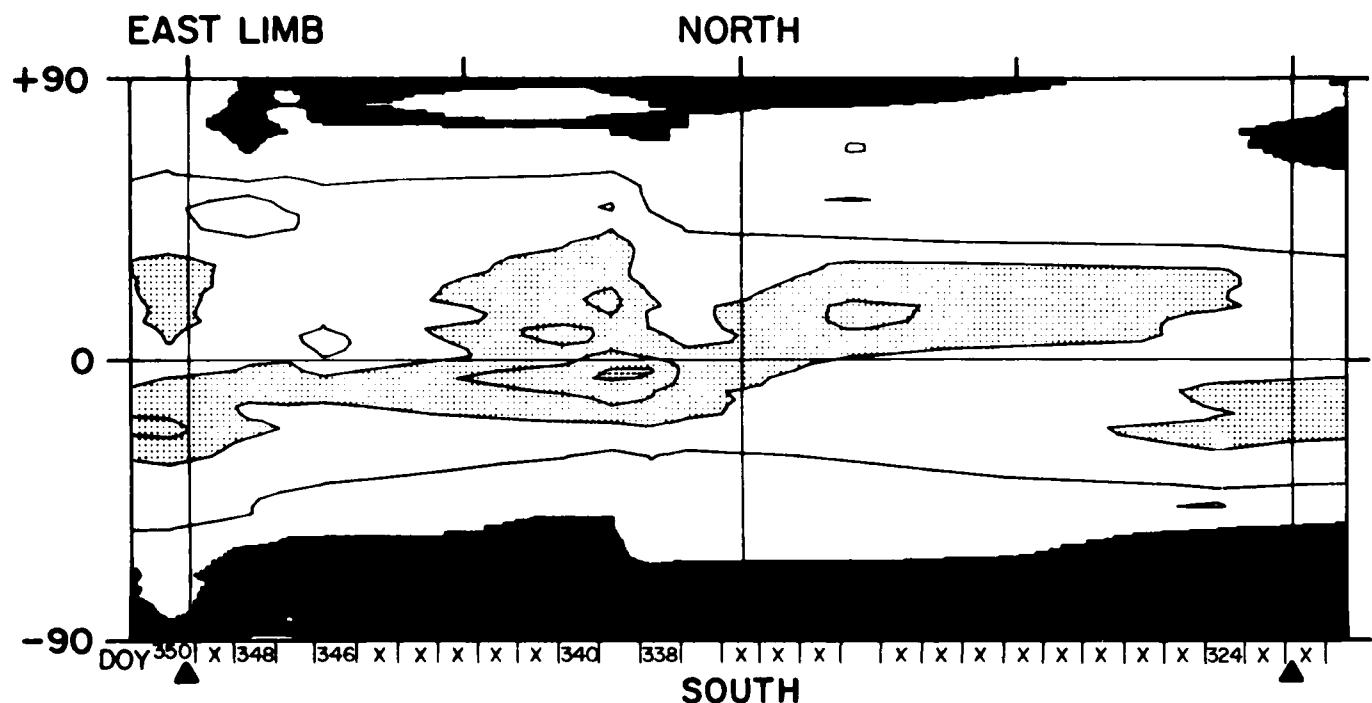
0 4 8 12 16 20 24 28 MIL

X = NO DATA

# NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1729 HEIGHT 1.15 R<sub>⊕</sub> YEAR 1982



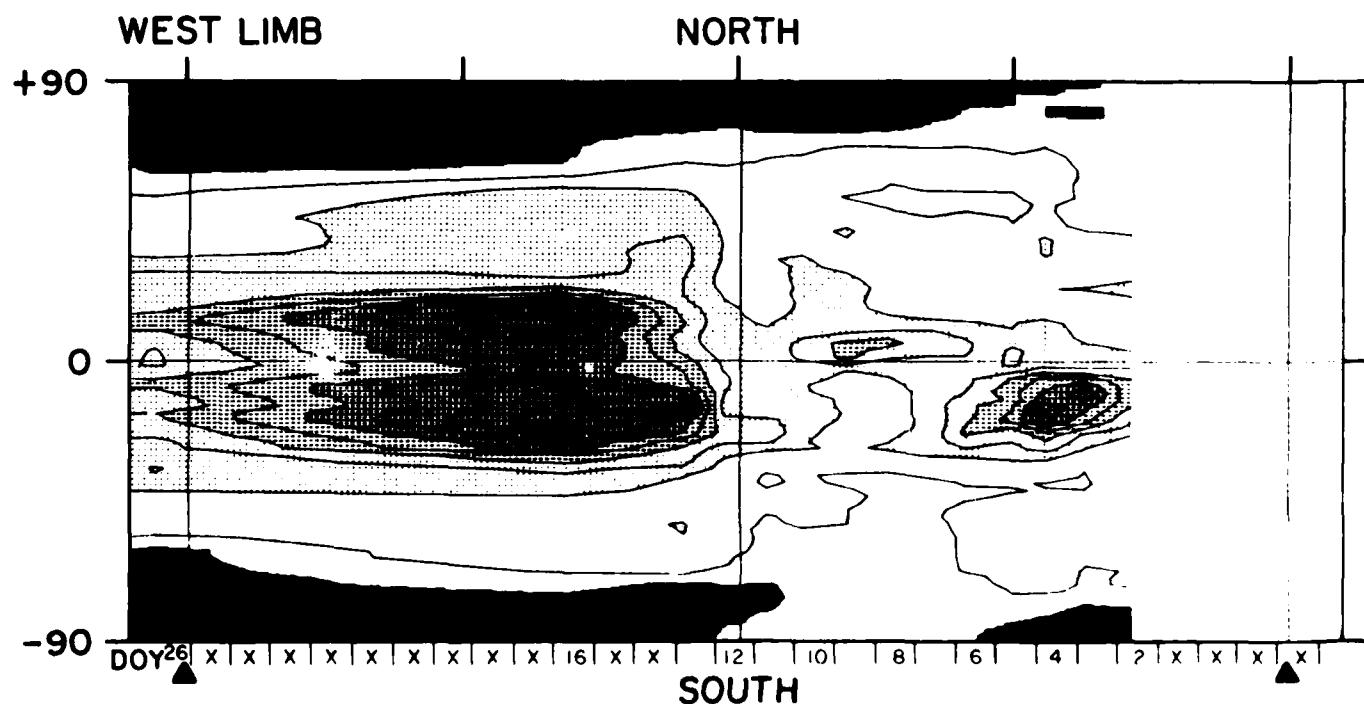
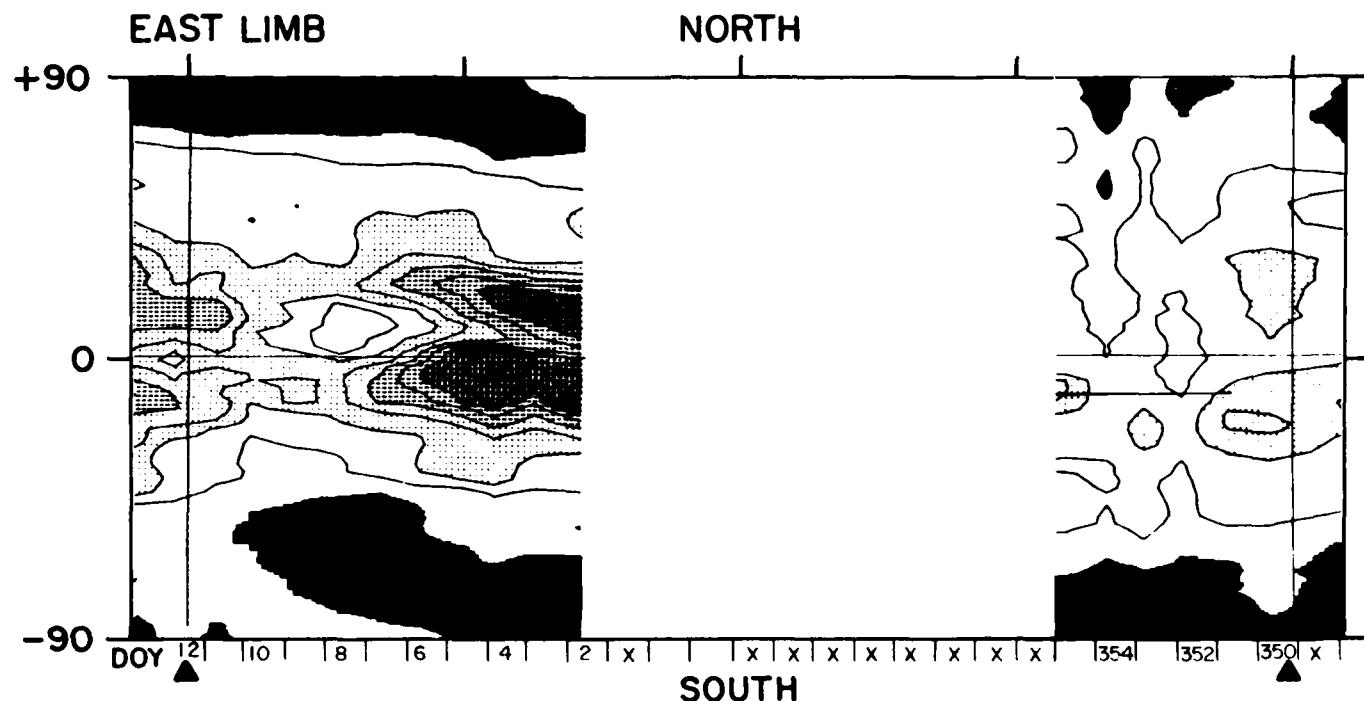
0 4 8 12 16 20 24 28 MIL  
[Scale bar markings: 0, 4, 8, 12, 16, 20, 24, 28]

X = NO DATA

# NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1730 HEIGHT 1.15R<sub>•</sub> YEAR 1982



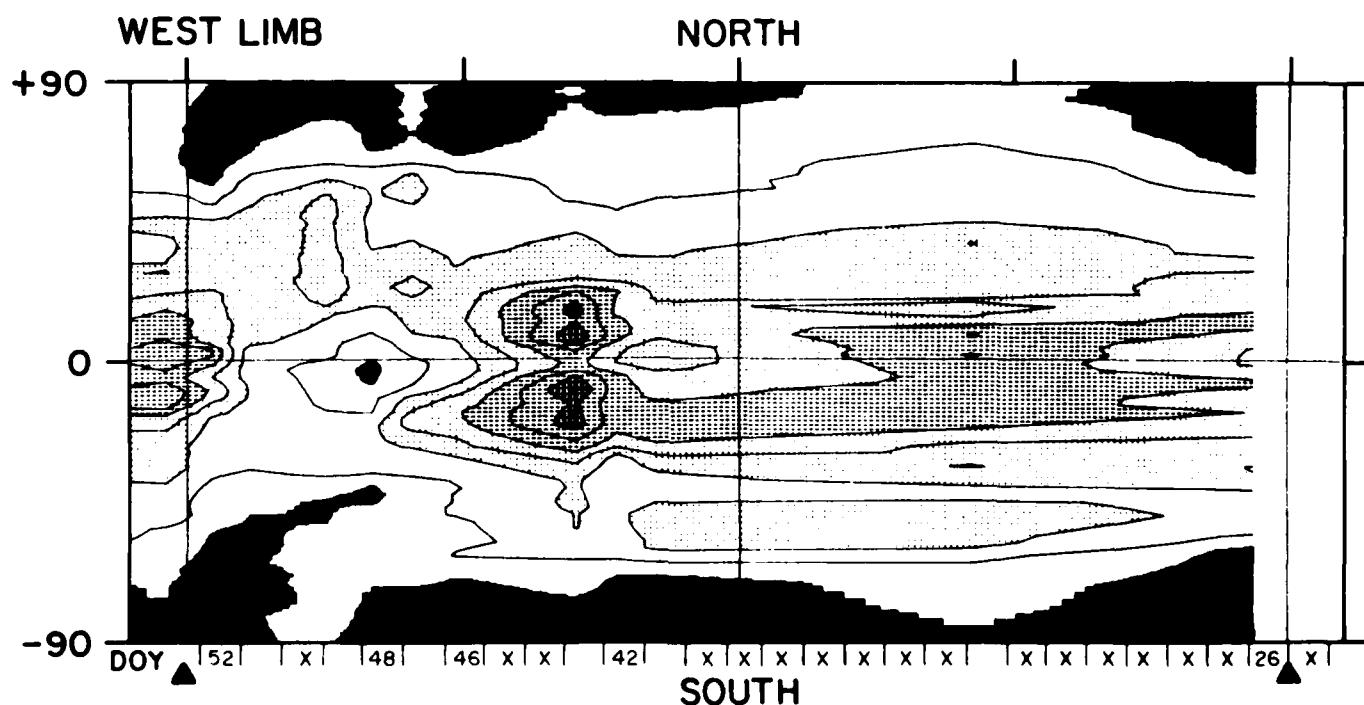
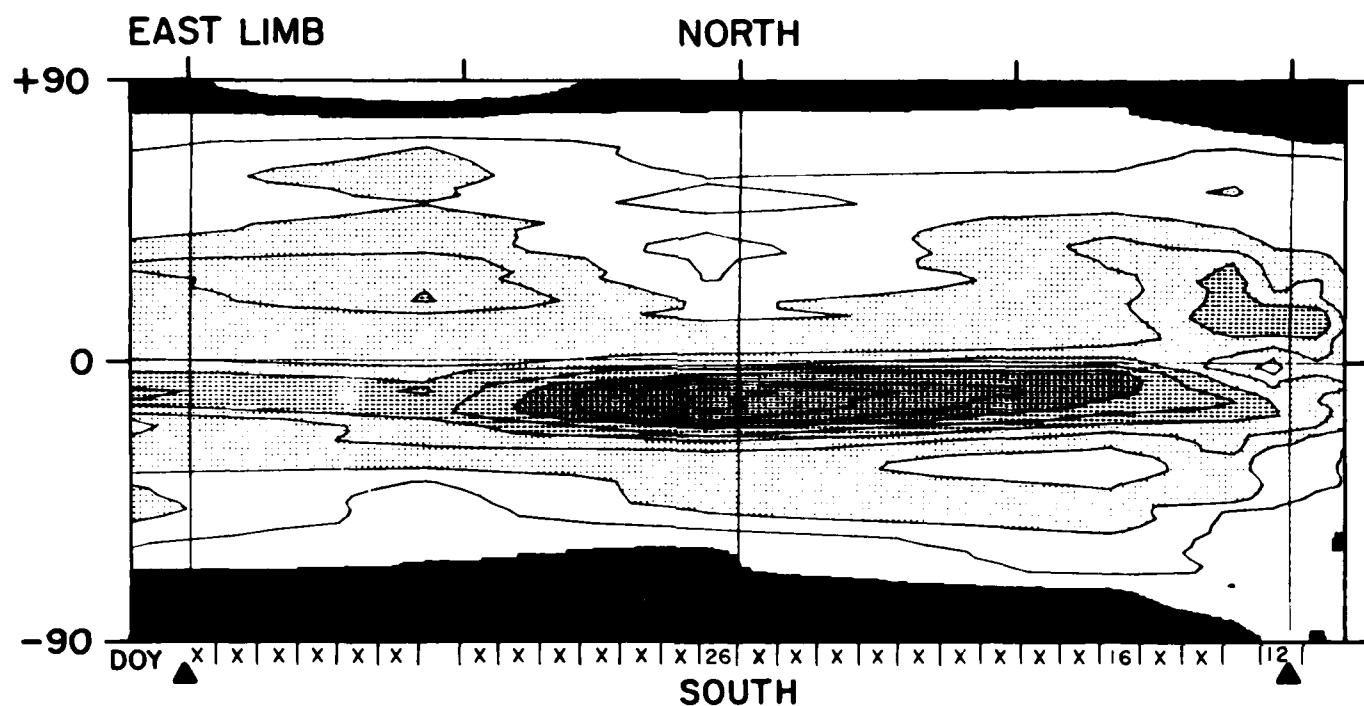
0 4 8 12 16 20 24 28 MIL

X = NO DATA

# NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1731 HEIGHT 1.15 R<sub>o</sub> YEAR 1983

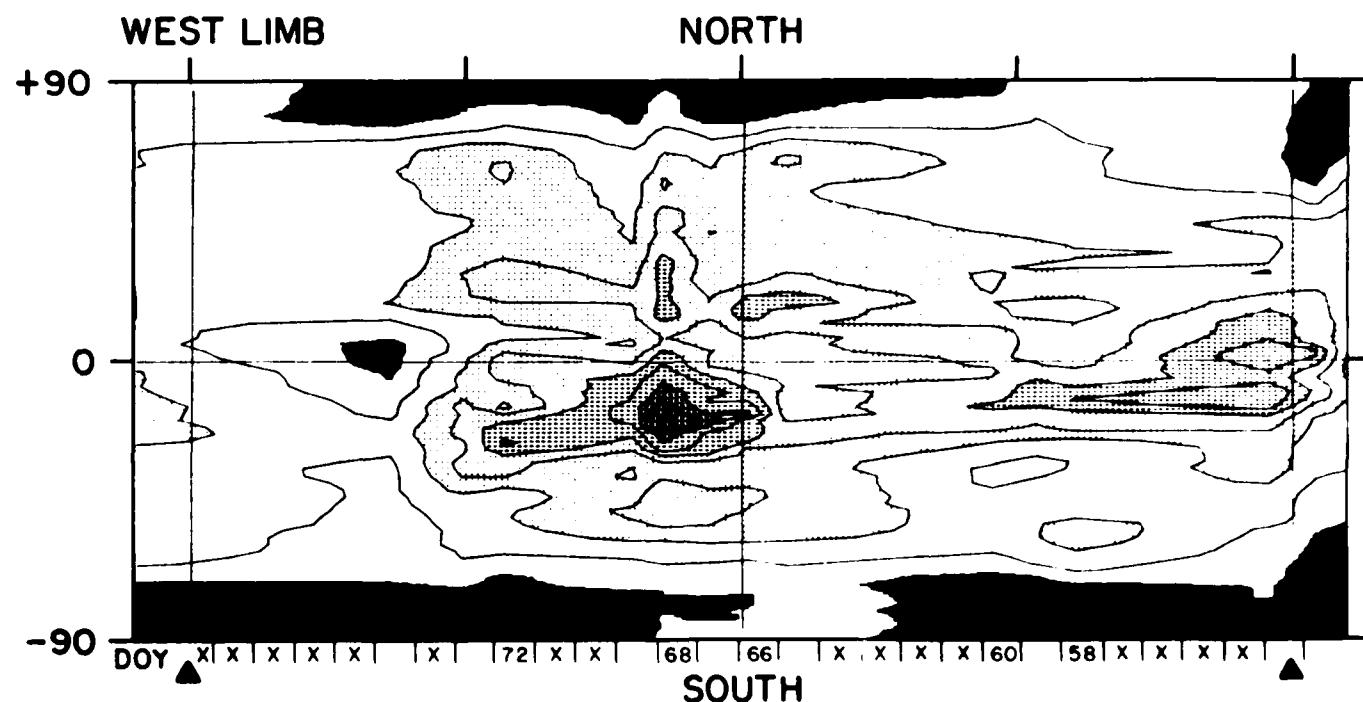
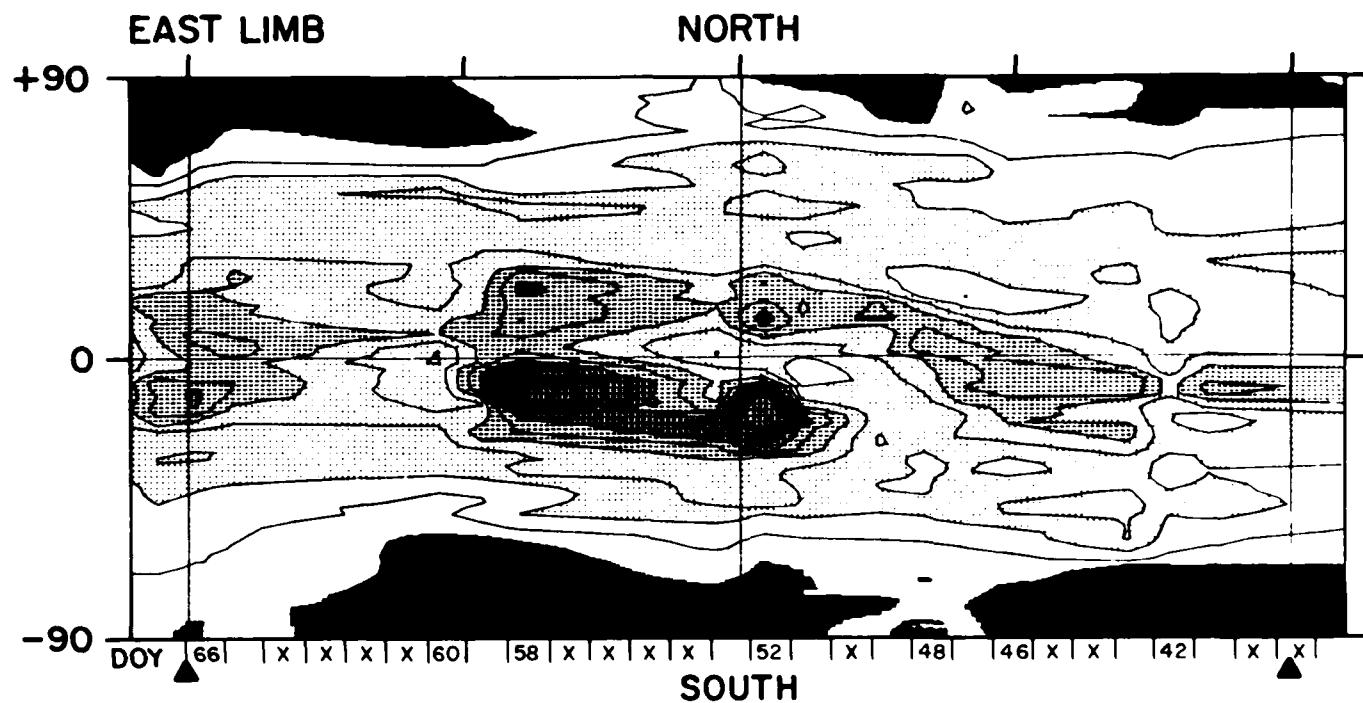


X = NO DATA

**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK**

**Fe XIV, 5303 Å CORONAL PHOTOMETER**

**ROTATION 1732 HEIGHT 1.15 R<sub>•</sub> YEAR 1983**



0 4 8 12 16 20 24 28 MIL

X = NO DATA

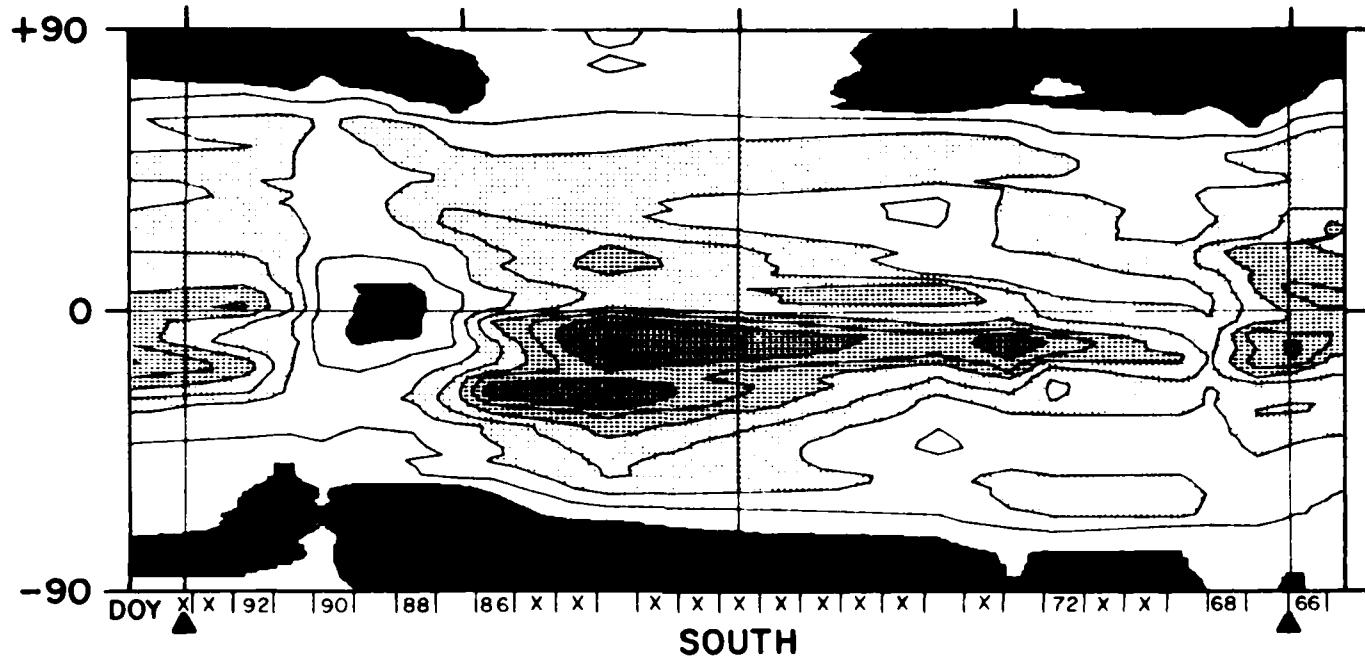
**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK**

**Fe XIV, 5303 Å CORONAL PHOTOMETER**

**ROTATION 1733 HEIGHT 1.15R<sub>•</sub> YEAR 1983**

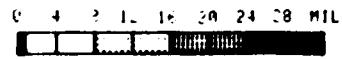
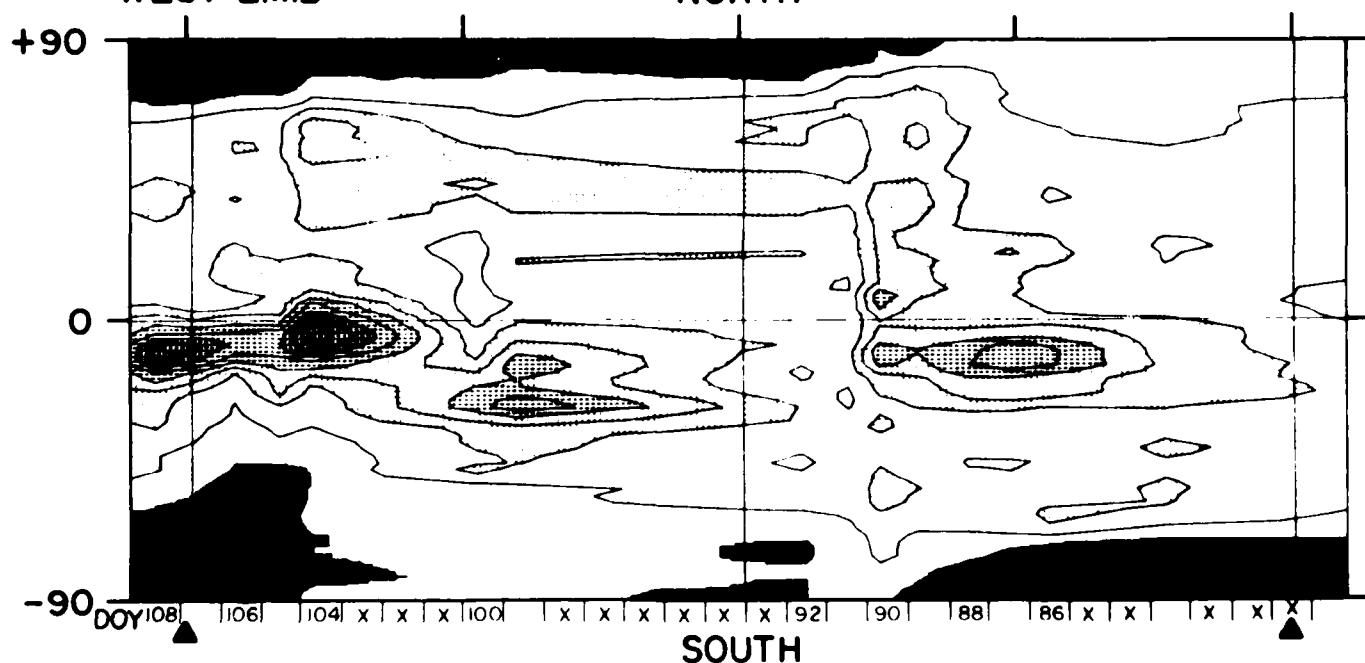
**EAST LIMB**

**NORTH**

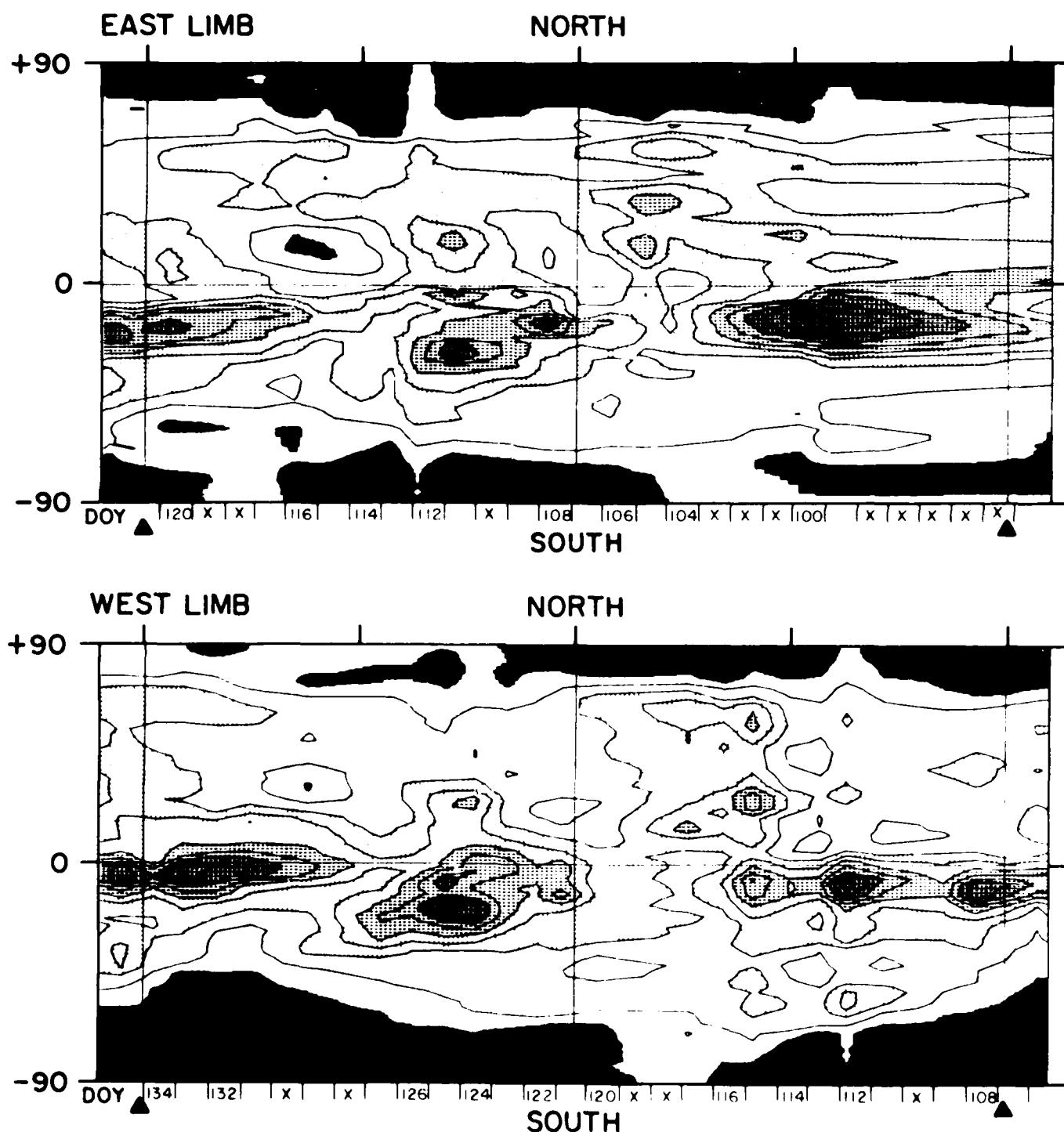


**WEST LIMB**

**NORTH**



**X = NO DATA**

**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK****Fe XIV, 5303 Å CORONAL PHOTOMETER****ROTATION 1734 HEIGHT 1.15R<sub>•</sub> YEAR 1983**

0 4 3 1 1+ 20 24 28 MIL  
[Scale bar markings]

X = NO DATA

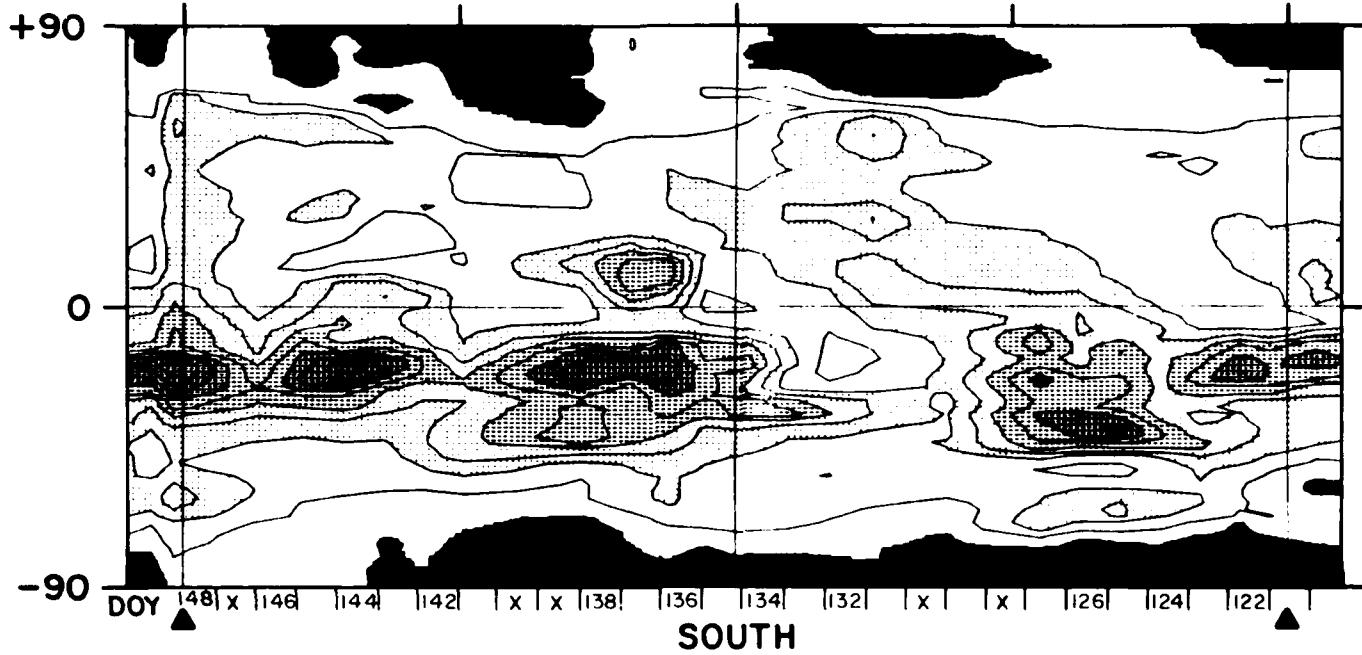
**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK**

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1735 HEIGHT 1.15 R<sub>o</sub> YEAR 1983

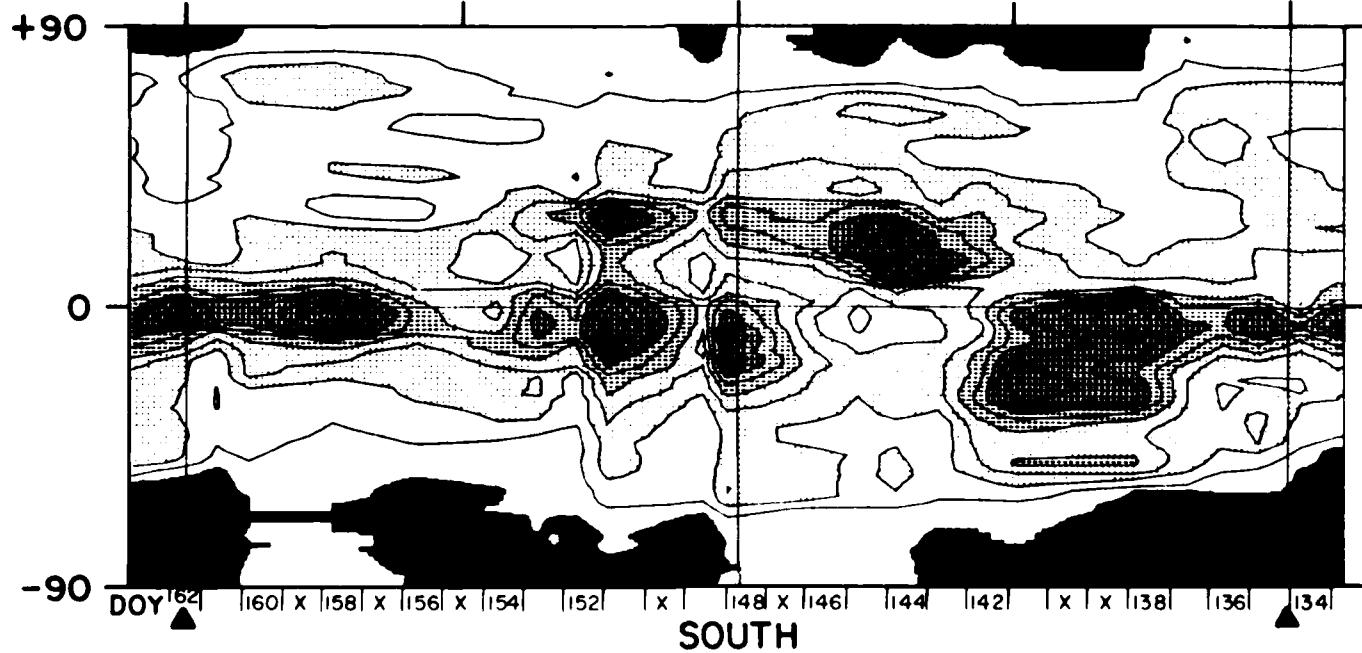
EAST LIMB

NORTH

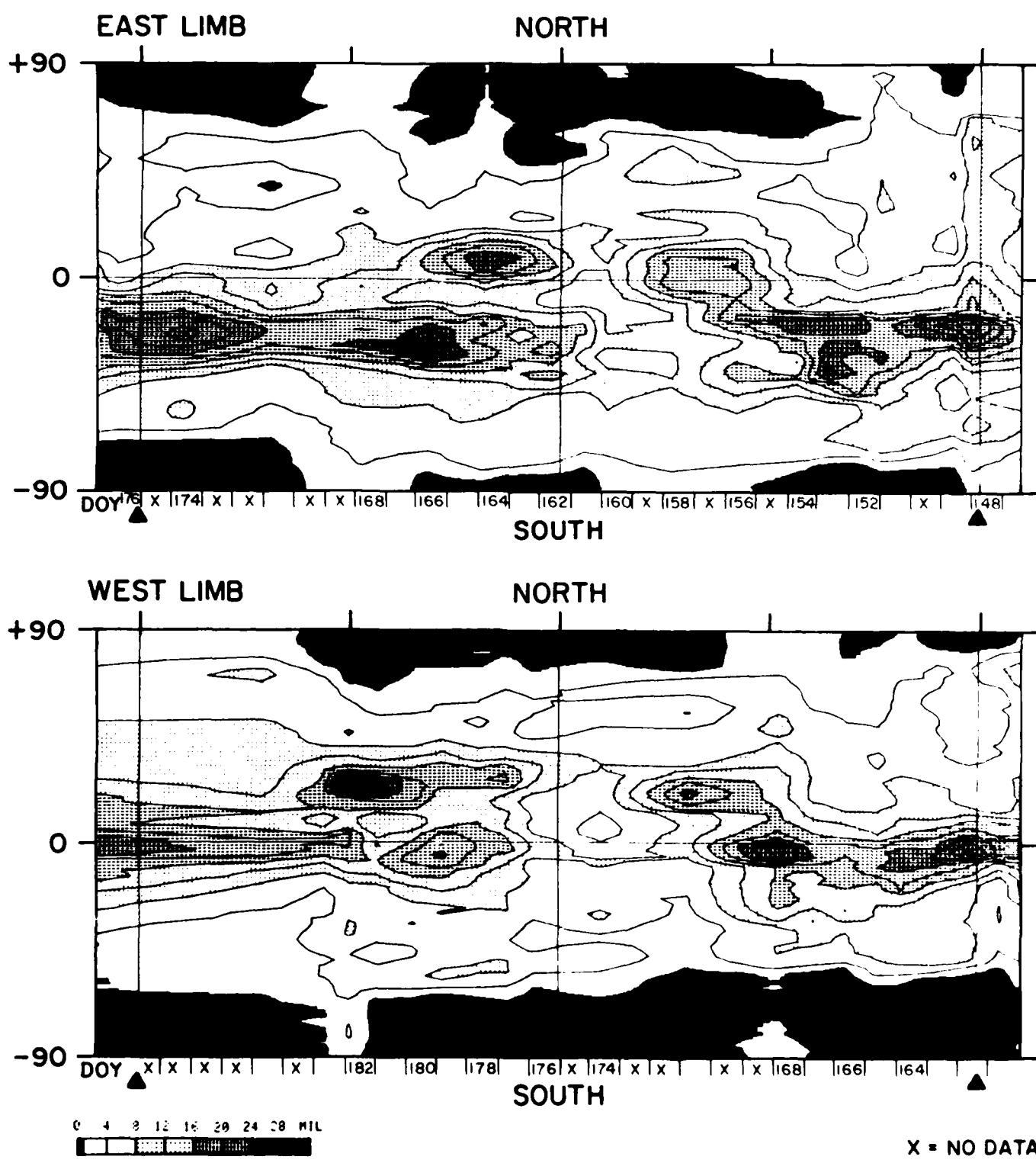


WEST LIMB

NORTH



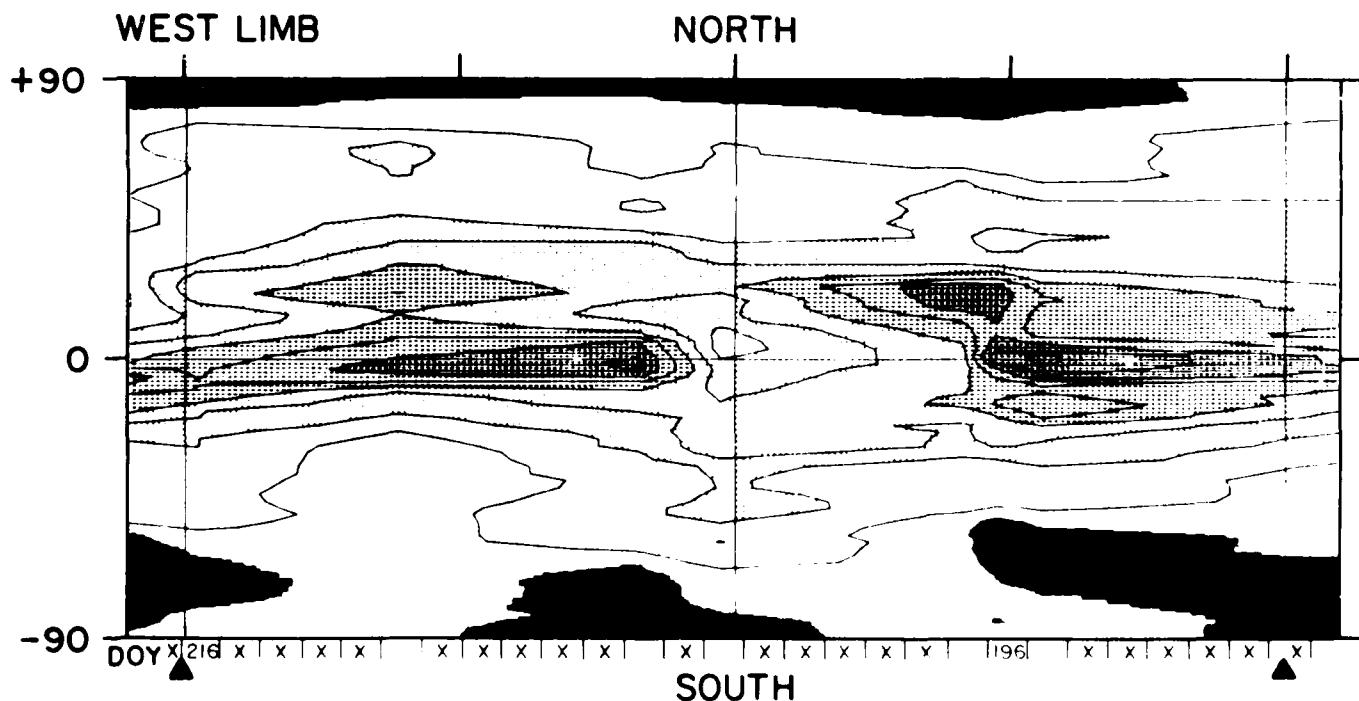
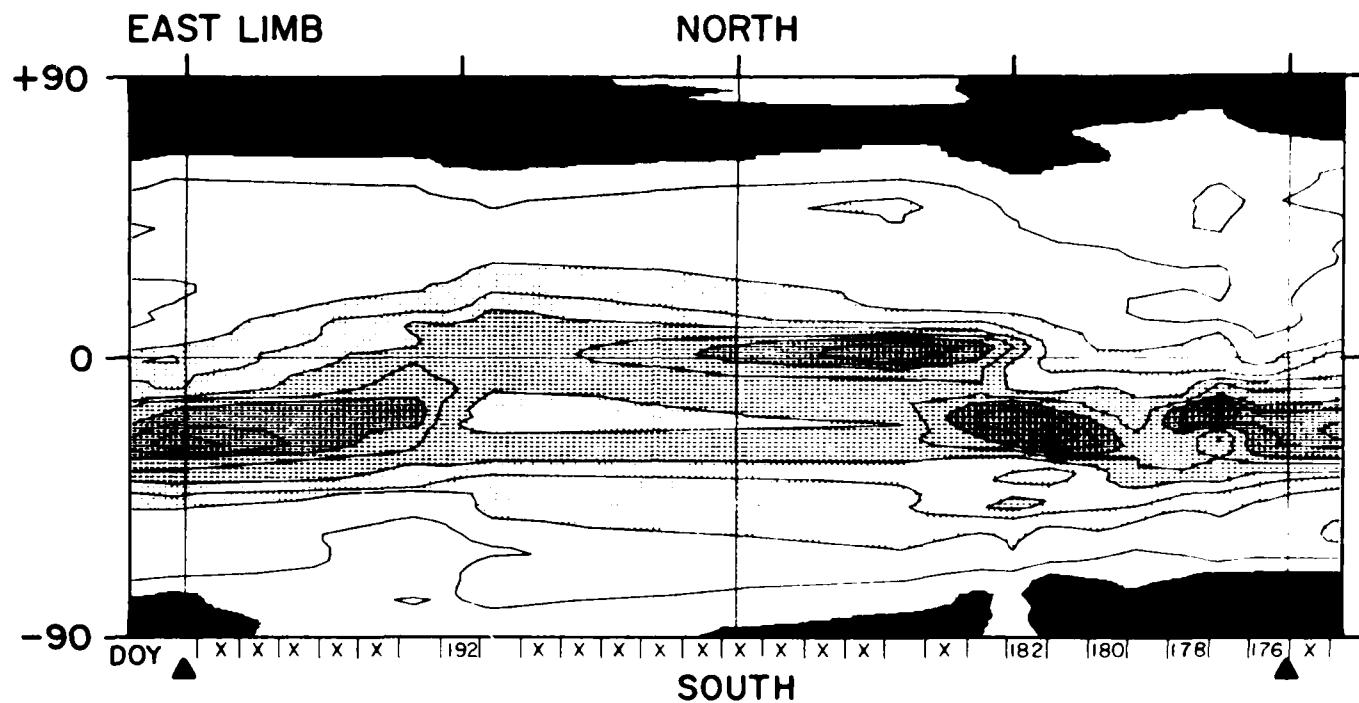
X = NO DATA

**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK****Fe XIV, 5303 Å CORONAL PHOTOMETER****ROTATION 1736 HEIGHT 1.15 R<sub>sun</sub> YEAR 1983**

NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1737 HEIGHT 1.15 R<sub>o</sub> YEAR 1983

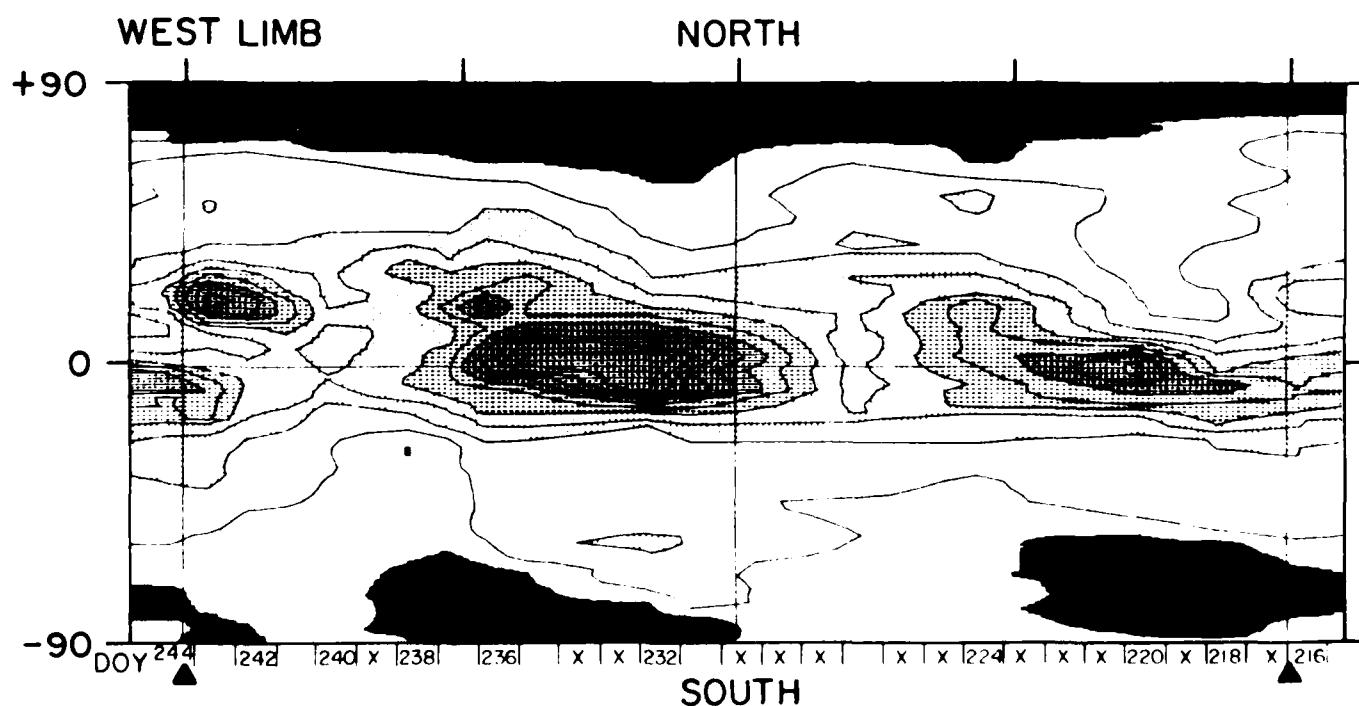
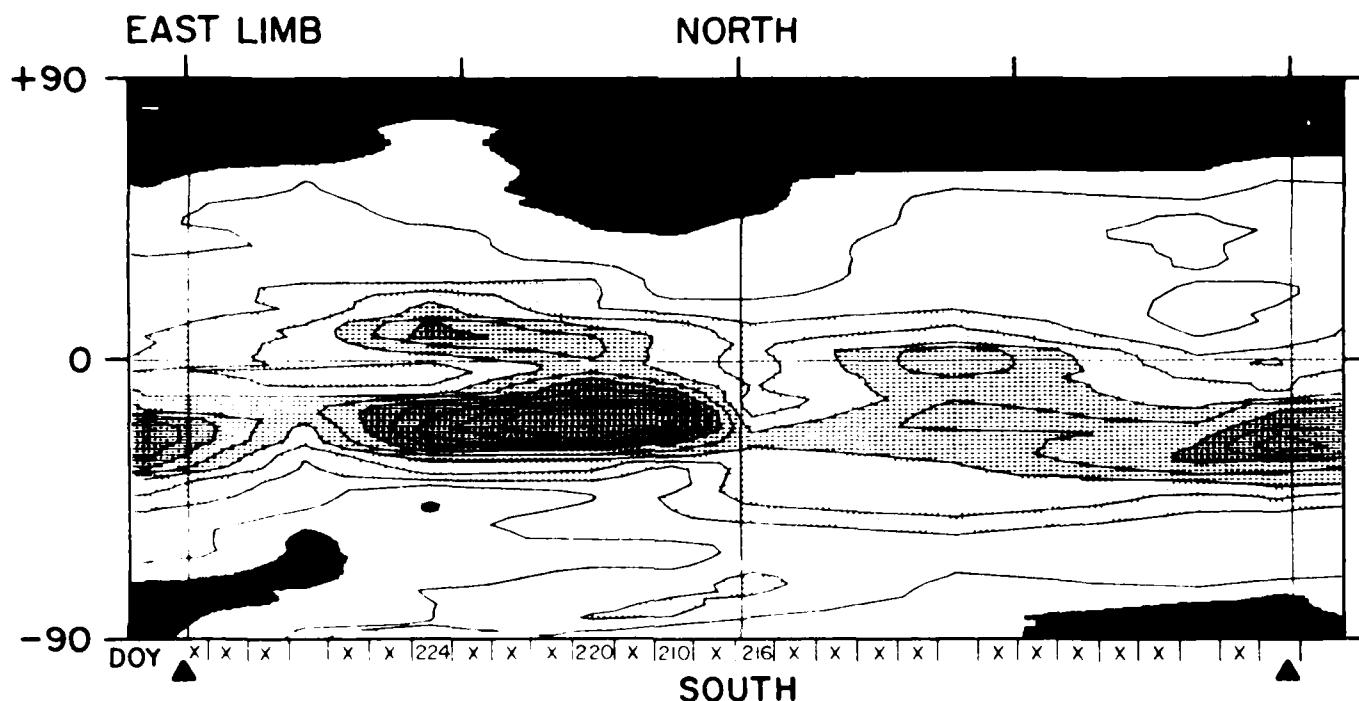


X = NO DATA

NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1738 HEIGHT 1.15 R<sub>o</sub> YEAR 1983



X = NO DATA

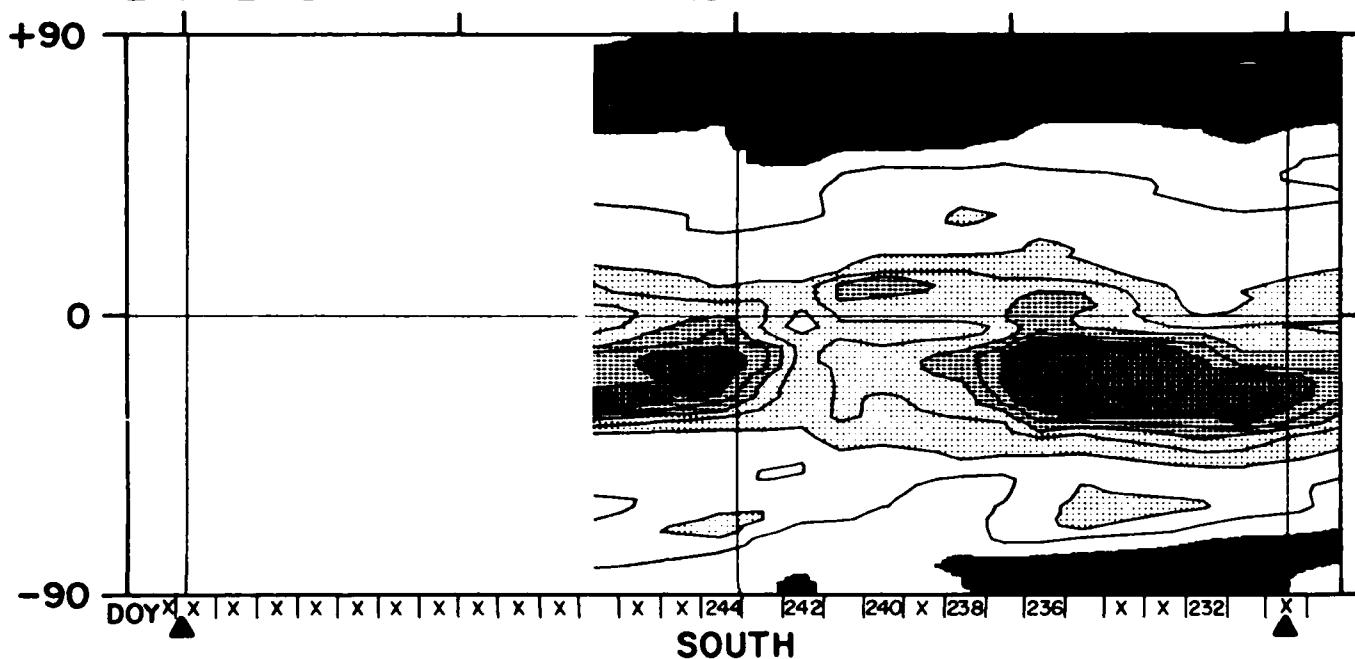
# NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1739 HEIGHT 1.15 R<sub>sun</sub> YEAR 1983

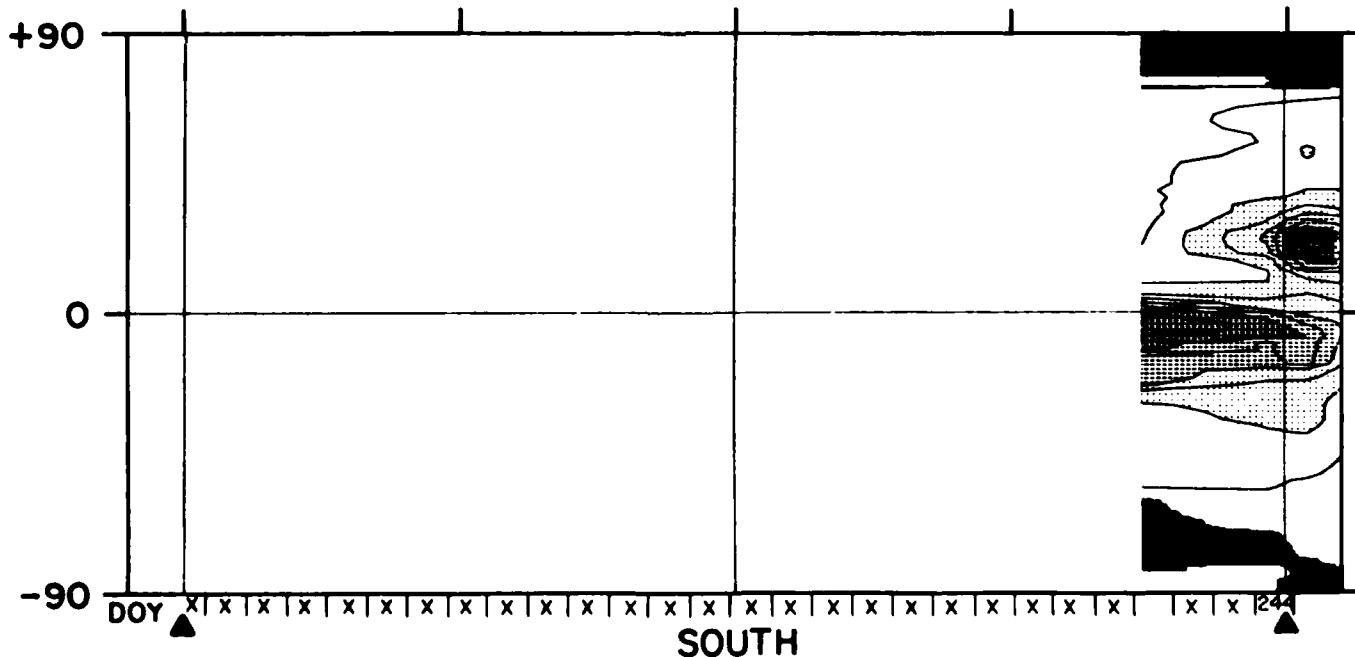
EAST LIMB

NORTH



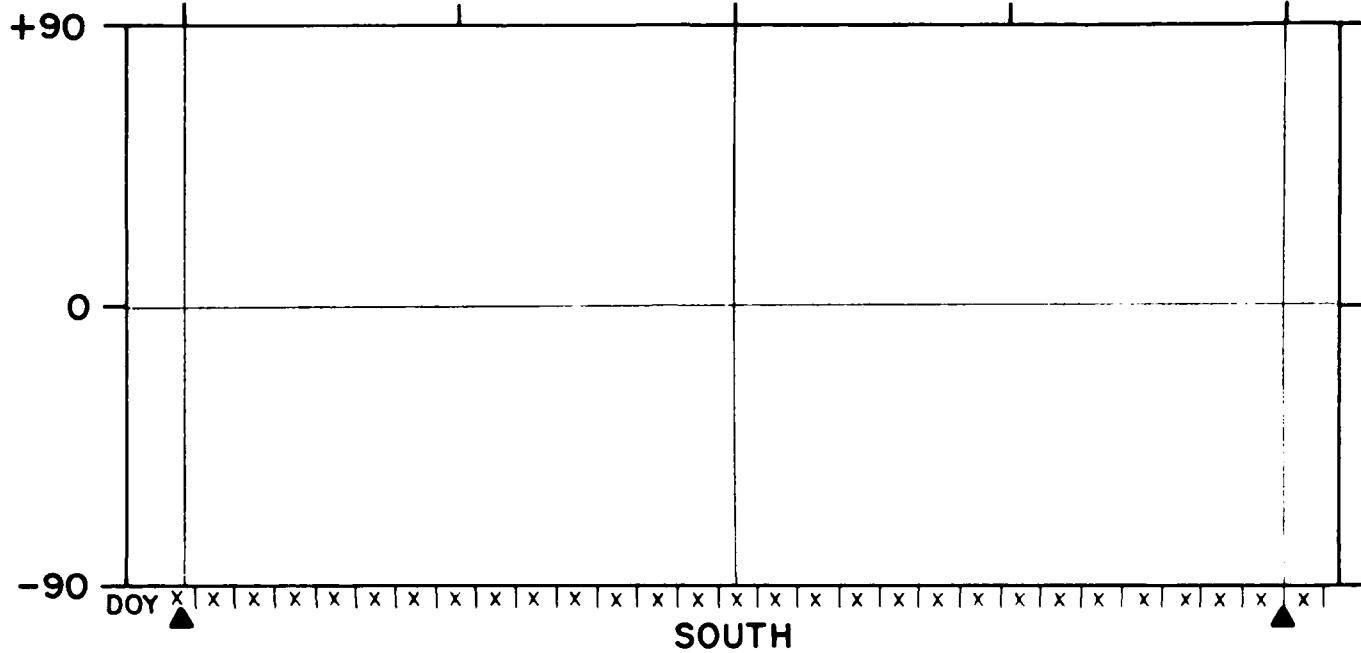
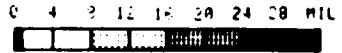
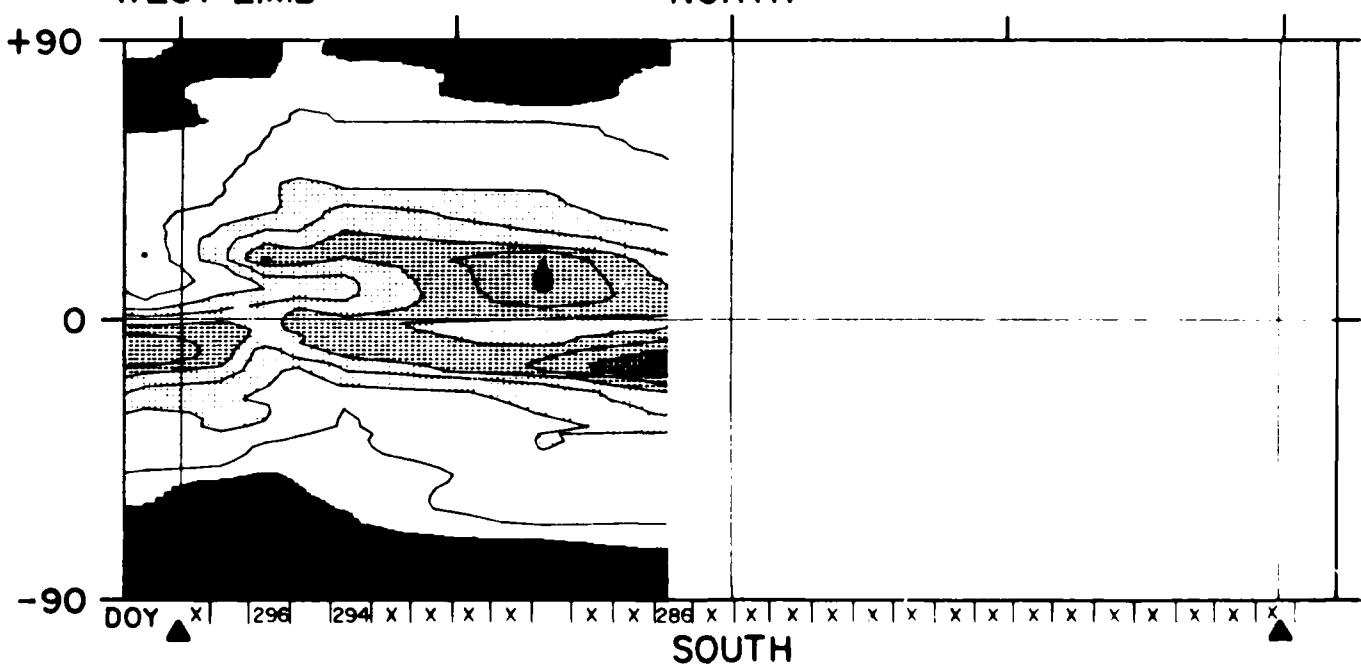
WEST LIMB

NORTH



0 4 8 12 16 20 24 28 MIL

X = NO DATA

**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK****Fe XIV, 5303 Å CORONAL PHOTOMETER****ROTATION 1740 HEIGHT 1.15 R<sub>⊕</sub> YEAR 1983****EAST LIMB****NORTH****WEST LIMB****NORTH**

X = NO DATA

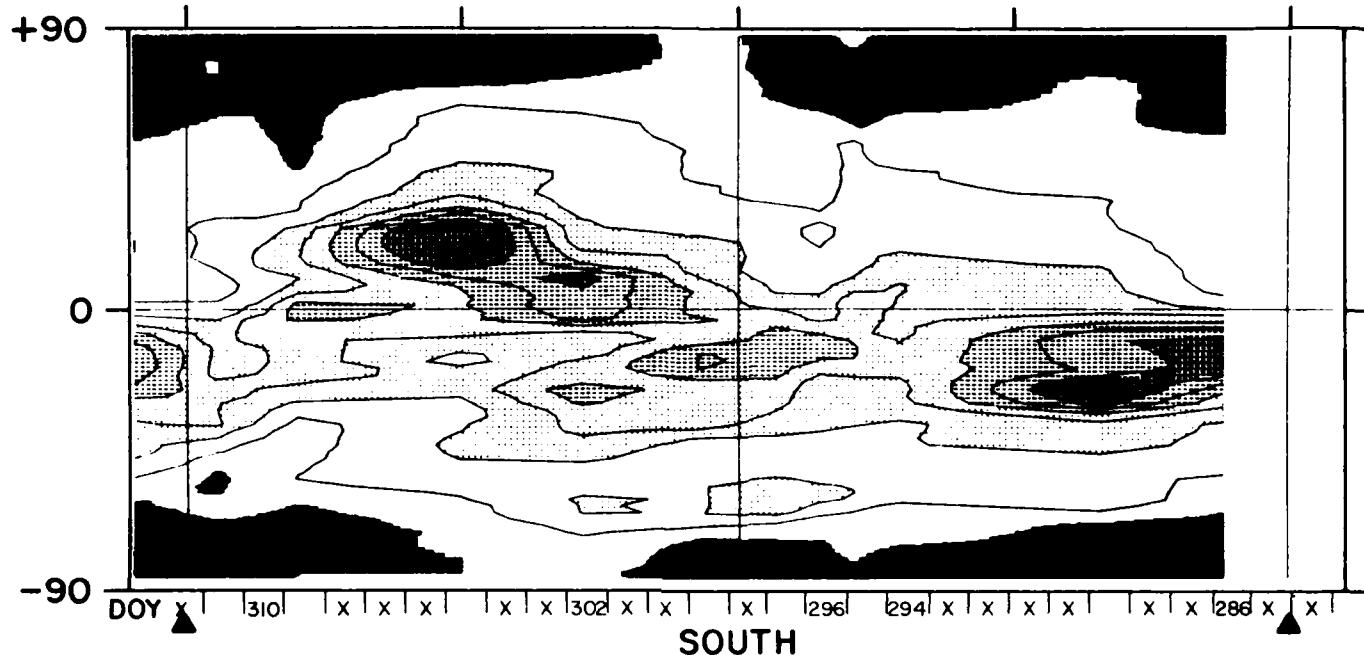
# NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1741    HEIGHT 1.15 R<sub>o</sub>    YEAR 1983

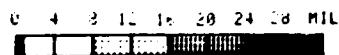
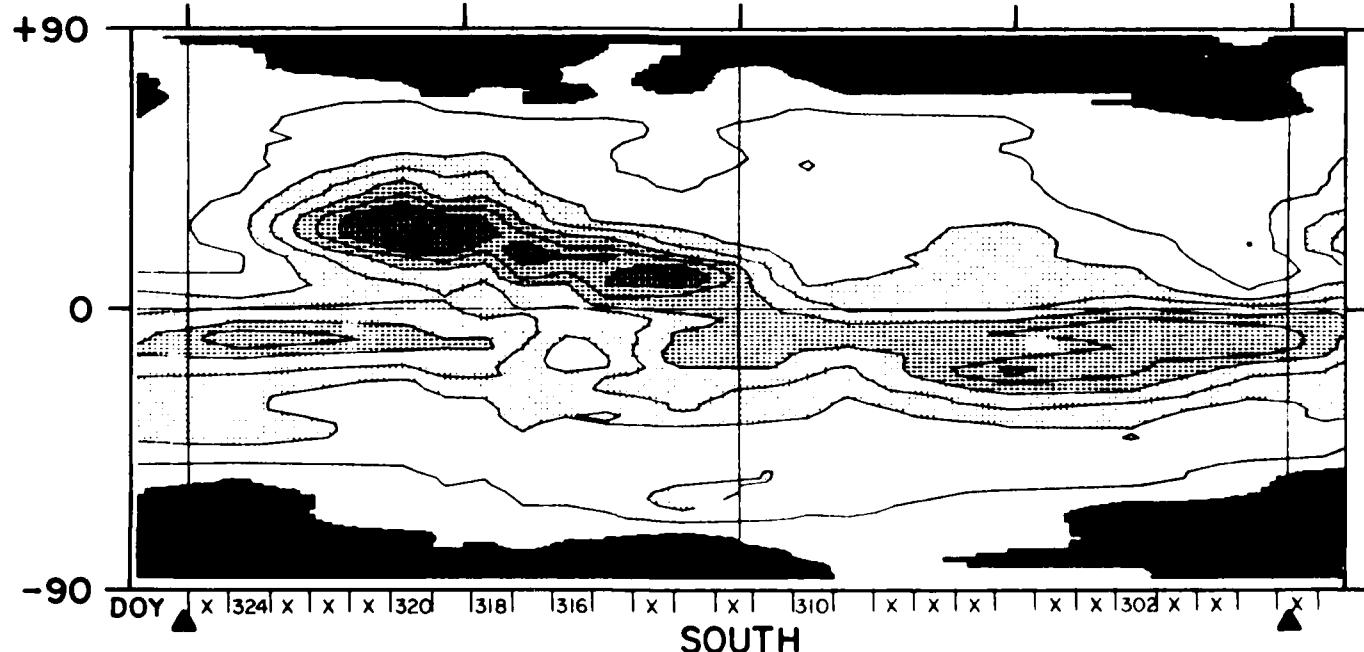
EAST LIMB

NORTH



WEST LIMB

NORTH

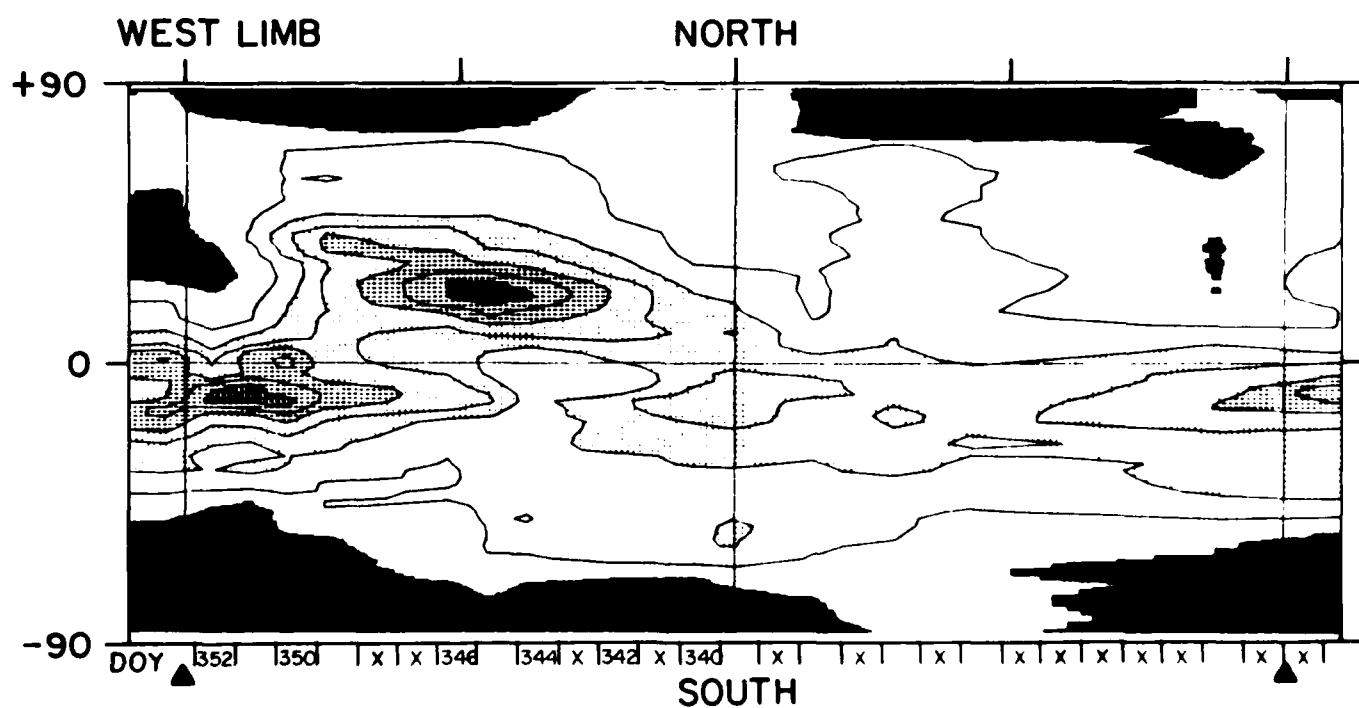
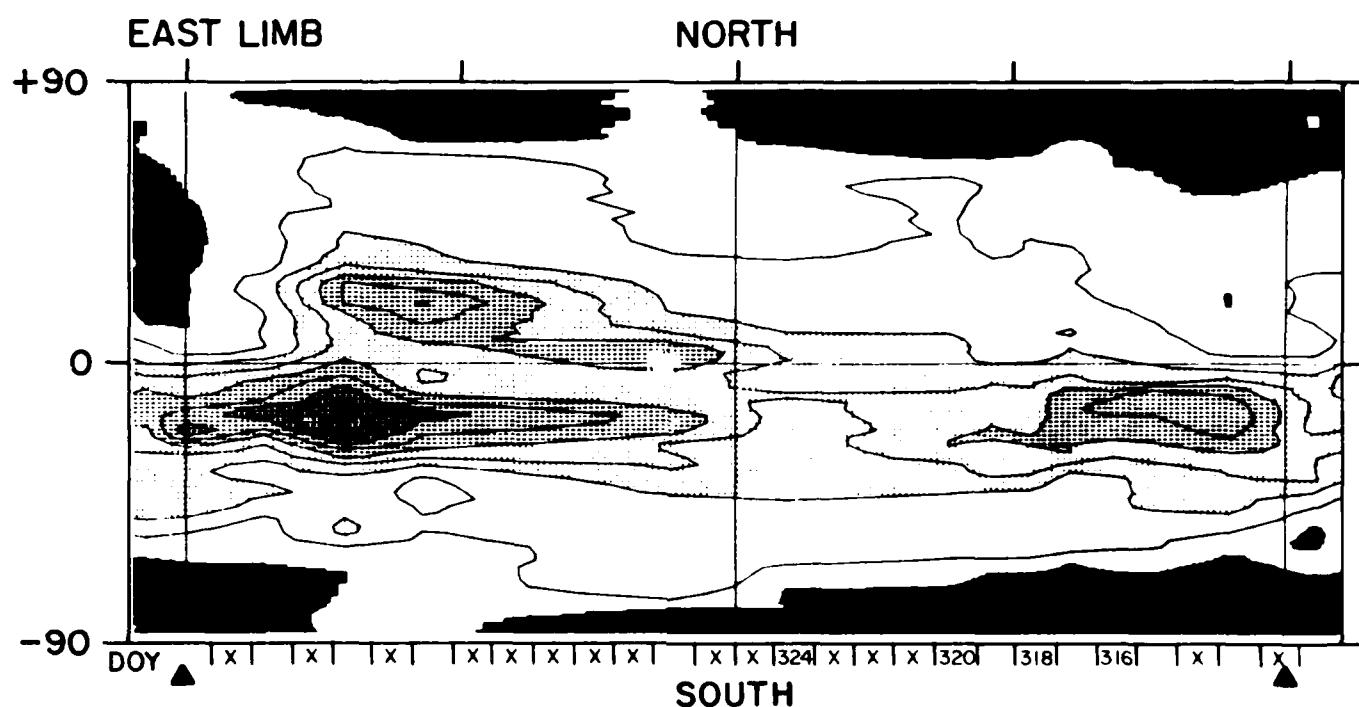


X = NO DATA

# NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1742 HEIGHT 1.15 R<sub>o</sub> YEAR 1983



0 4 8 12 16 20 24 28 MIL

X = NO DATA

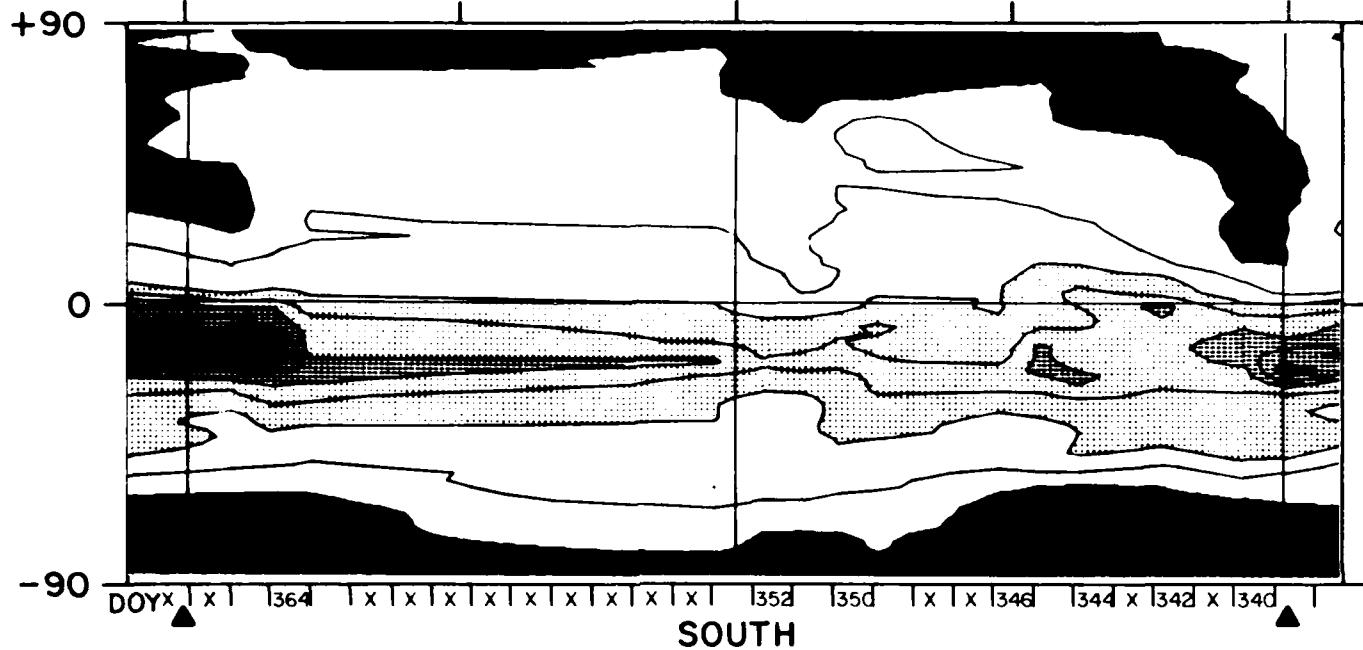
NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1743 HEIGHT 1.15 R<sub>o</sub> YEAR 1984

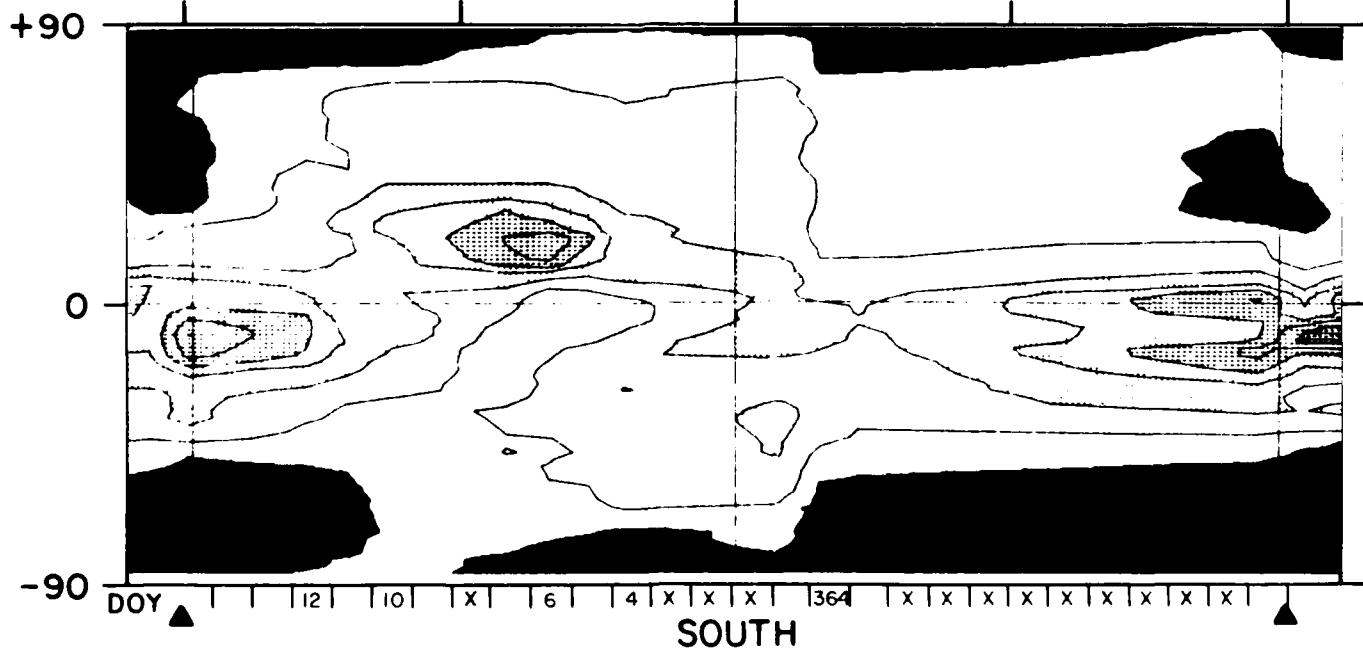
EAST LIMB

NORTH



WEST LIMB

NORTH

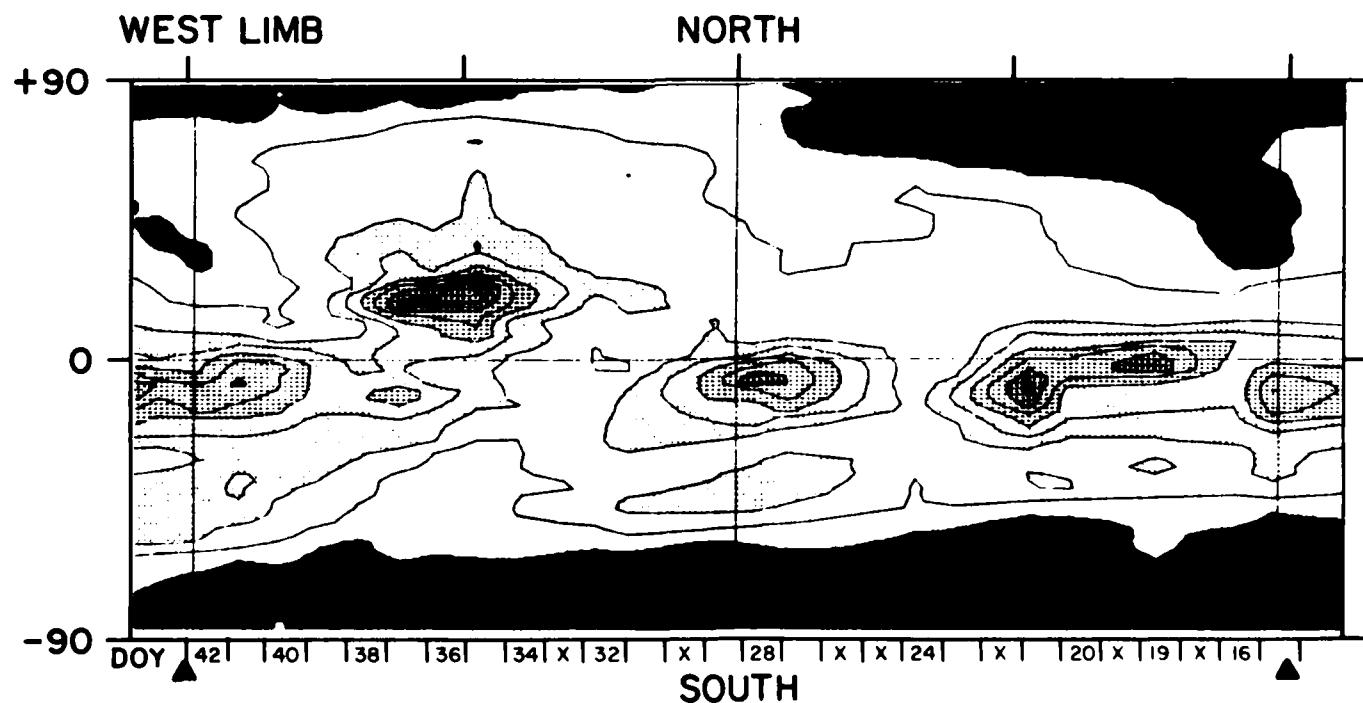
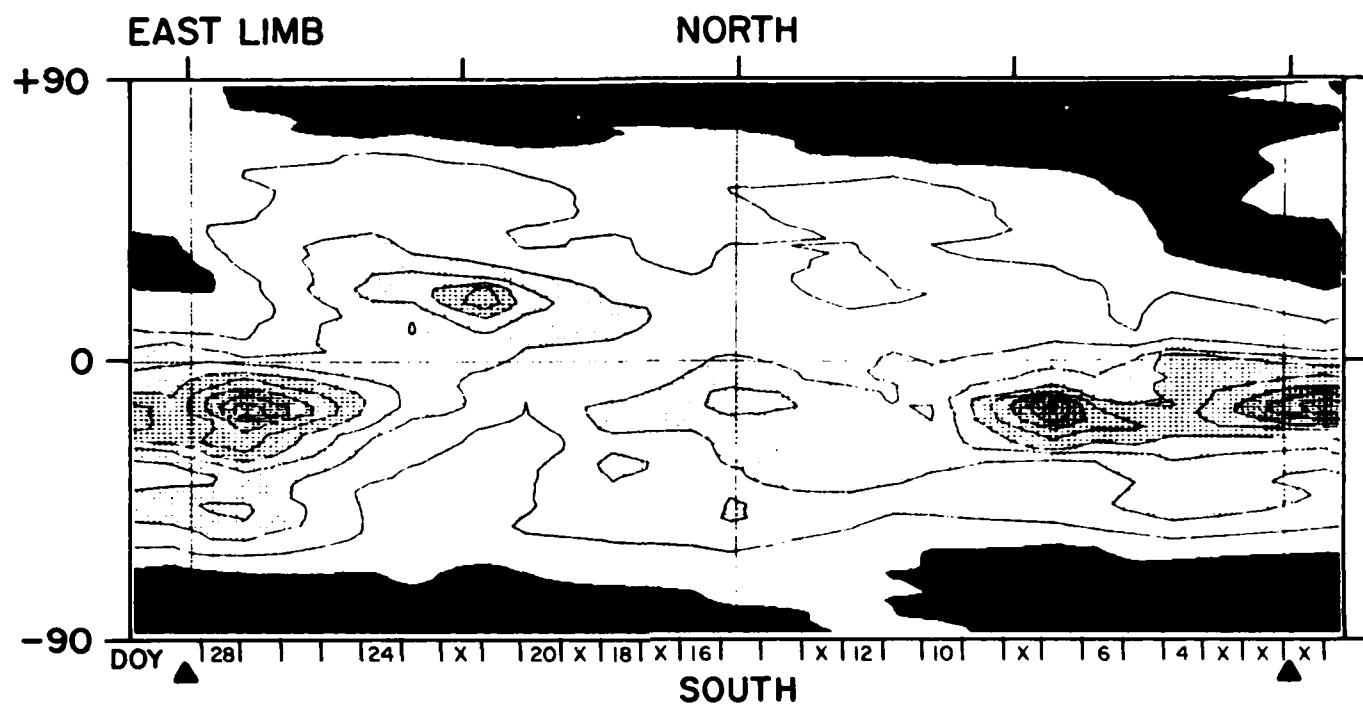


X = NO DATA

NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

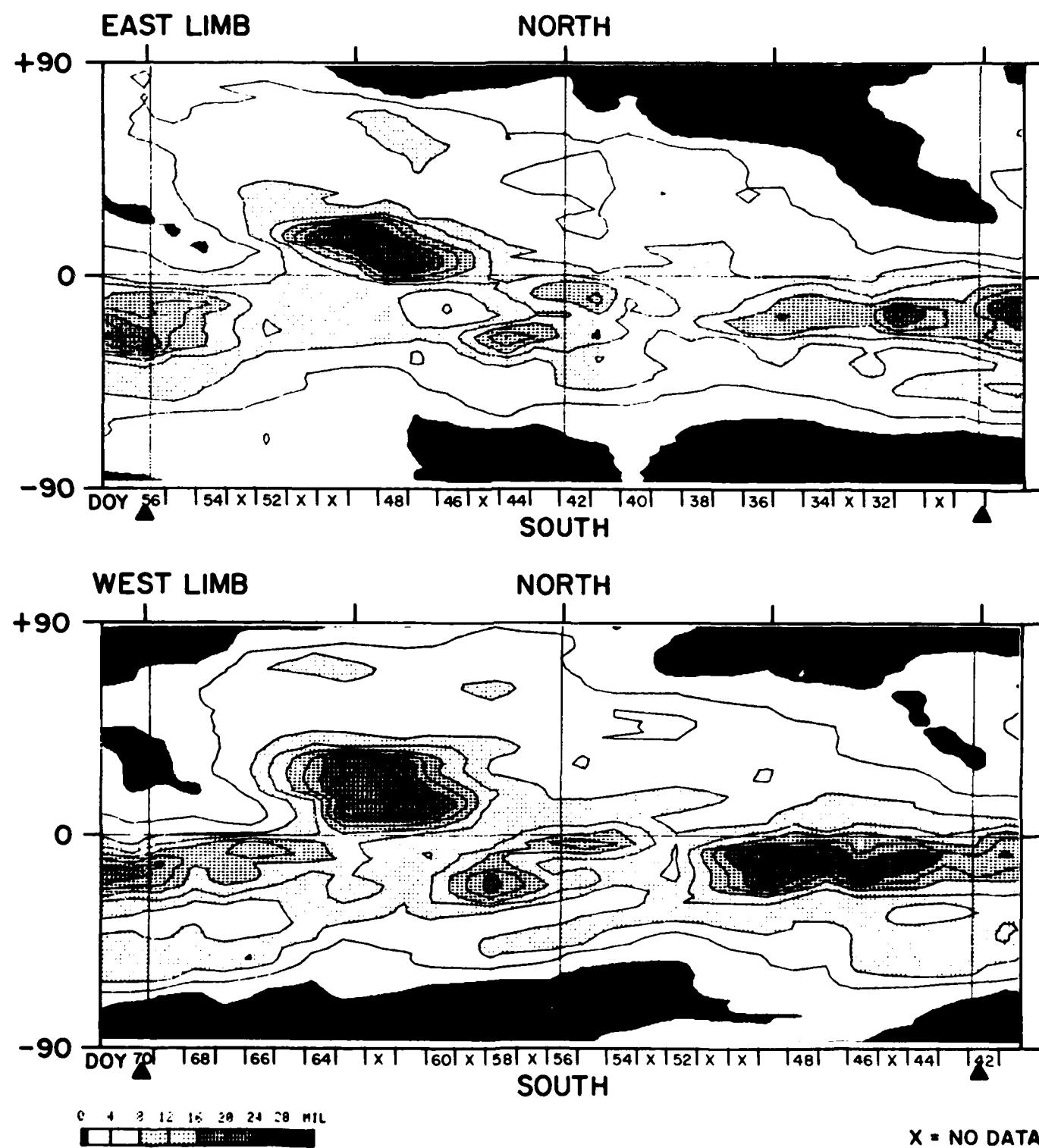
Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1744 HEIGHT 1.15 R<sub>o</sub> YEAR 1984



0 4 8 12 16 20 24 28 MIL

X = NO DATA

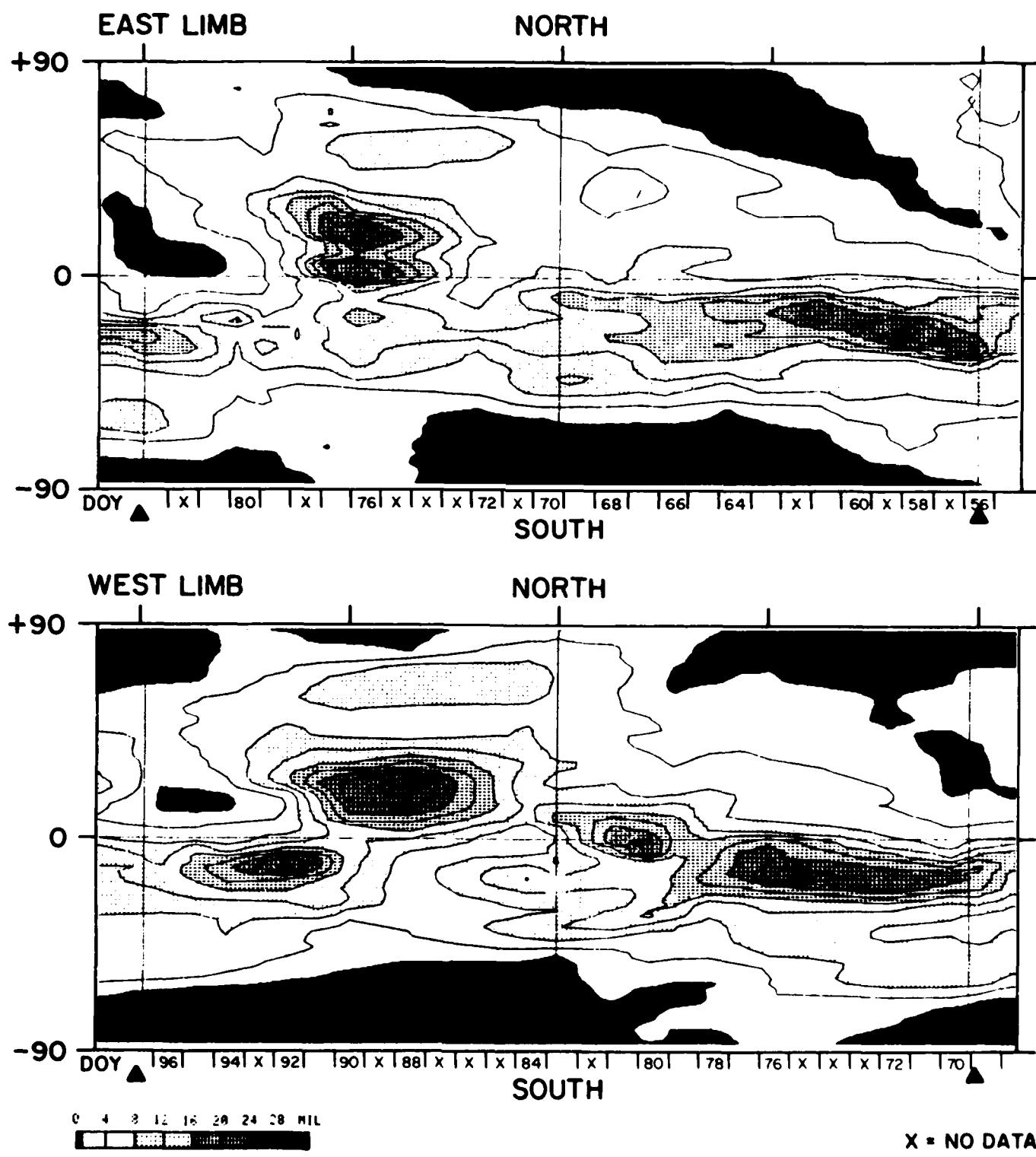
**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK****Fe XIV, 5303 Å CORONAL PHOTOMETER****ROTATION 1745 HEIGHT 1.15 R<sub>o</sub> YEAR 1984**

X = NO DATA

# NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1746 HEIGHT 1.15 R<sub>o</sub> YEAR 1984



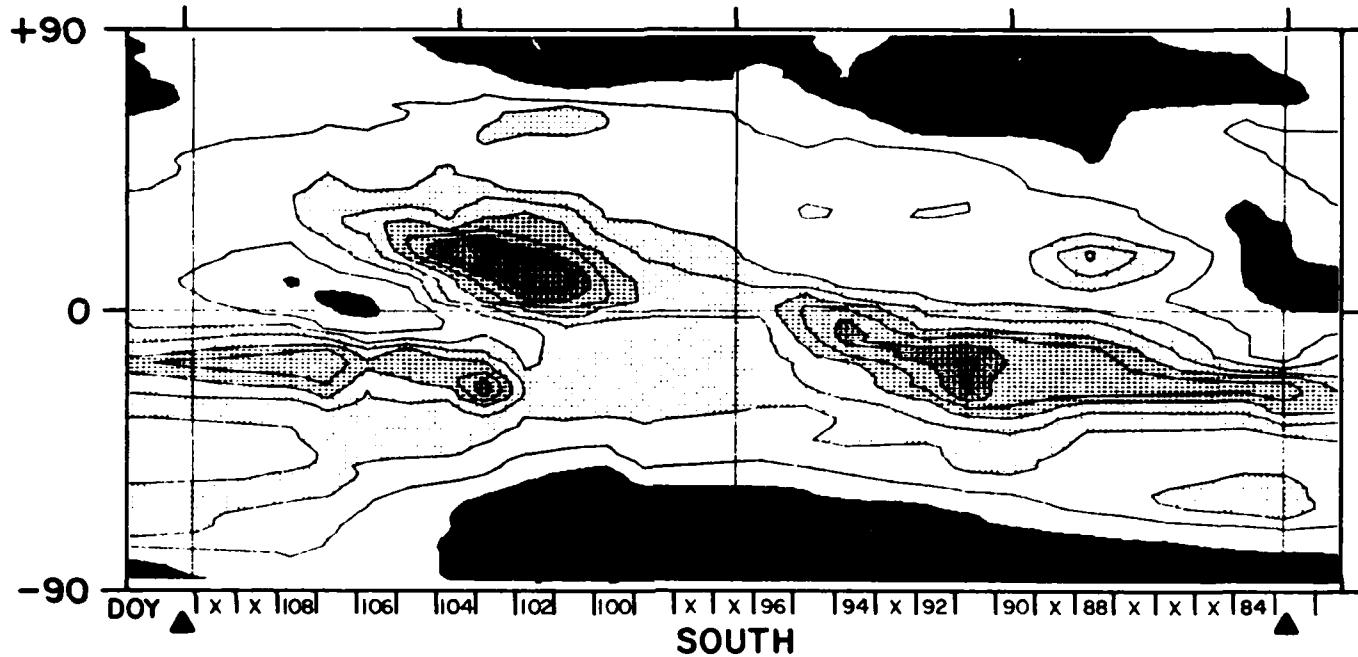
**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK**

**Fe XIV, 5303 Å CORONAL PHOTOMETER**

**ROTATION 1747 HEIGHT 1.15R<sub>o</sub> YEAR 1984**

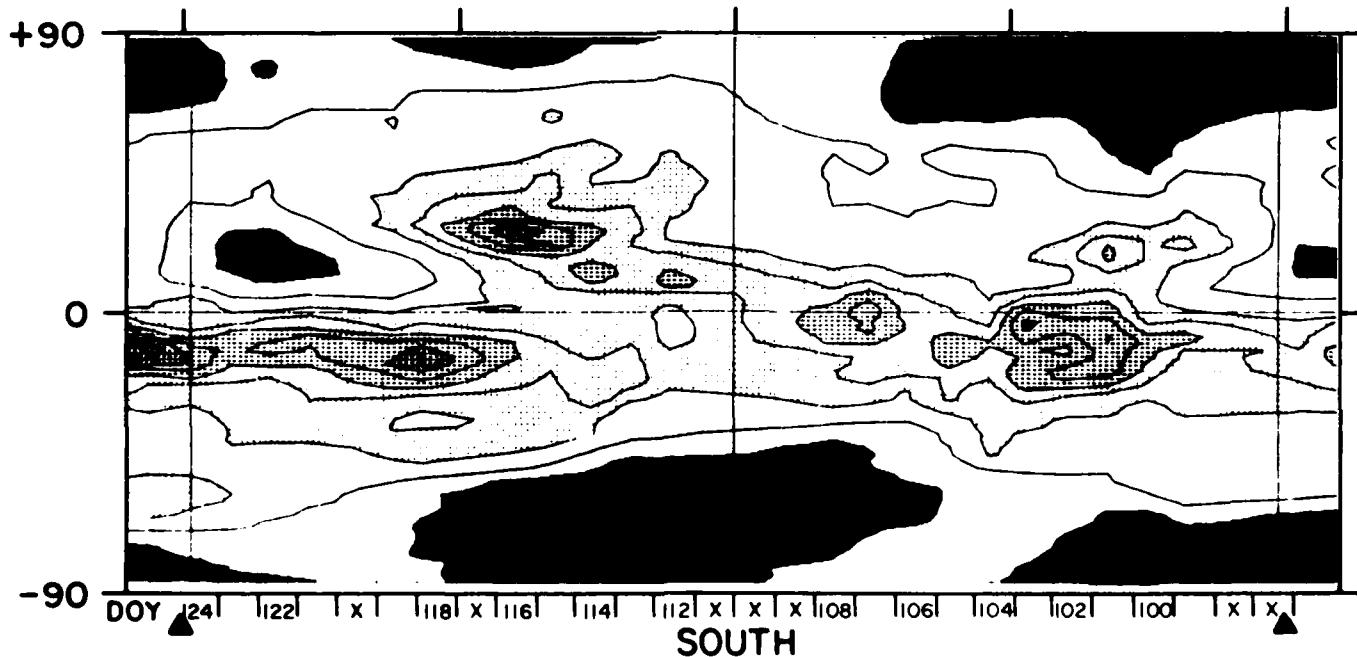
**EAST LIMB**

**NORTH**



**WEST LIMB**

**NORTH**

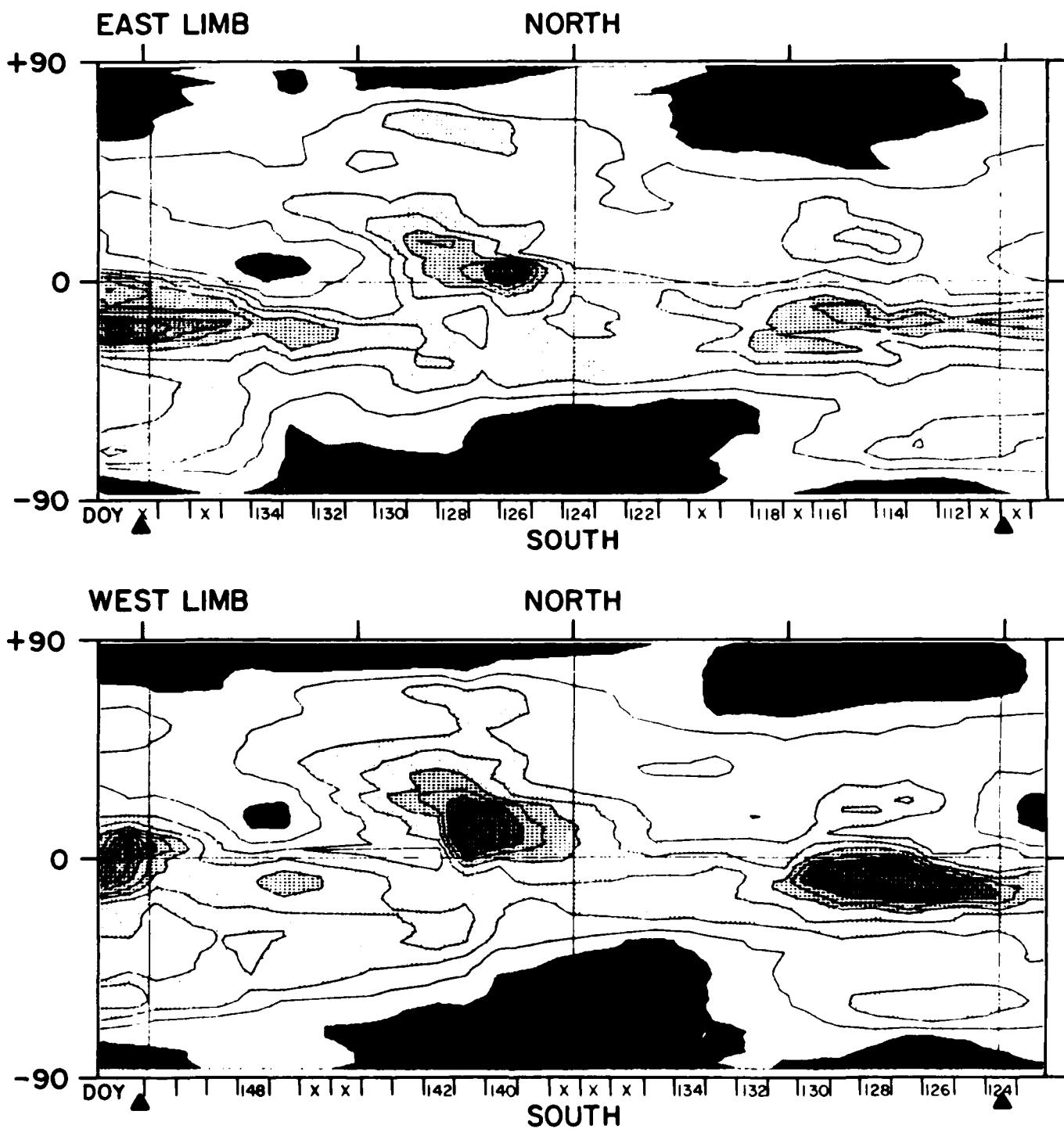


**X = NO DATA**

# NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1748 HEIGHT 1.15R<sub>o</sub> YEAR 1984



0 4 8 12 16 20 24 28 MIL

X = NO DATA

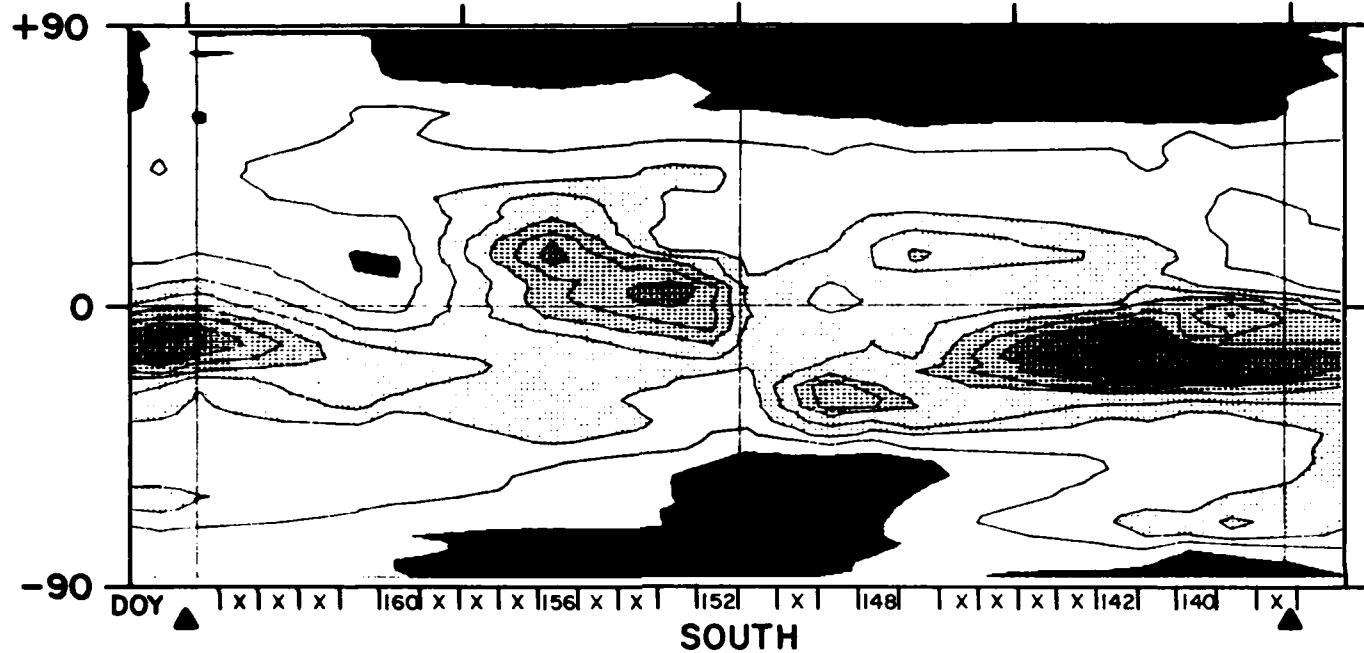
**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK**

**Fe XIV, 5303 Å CORONAL PHOTOMETER**

**ROTATION 1749 HEIGHT 1.15 R<sub>•</sub> YEAR 1984**

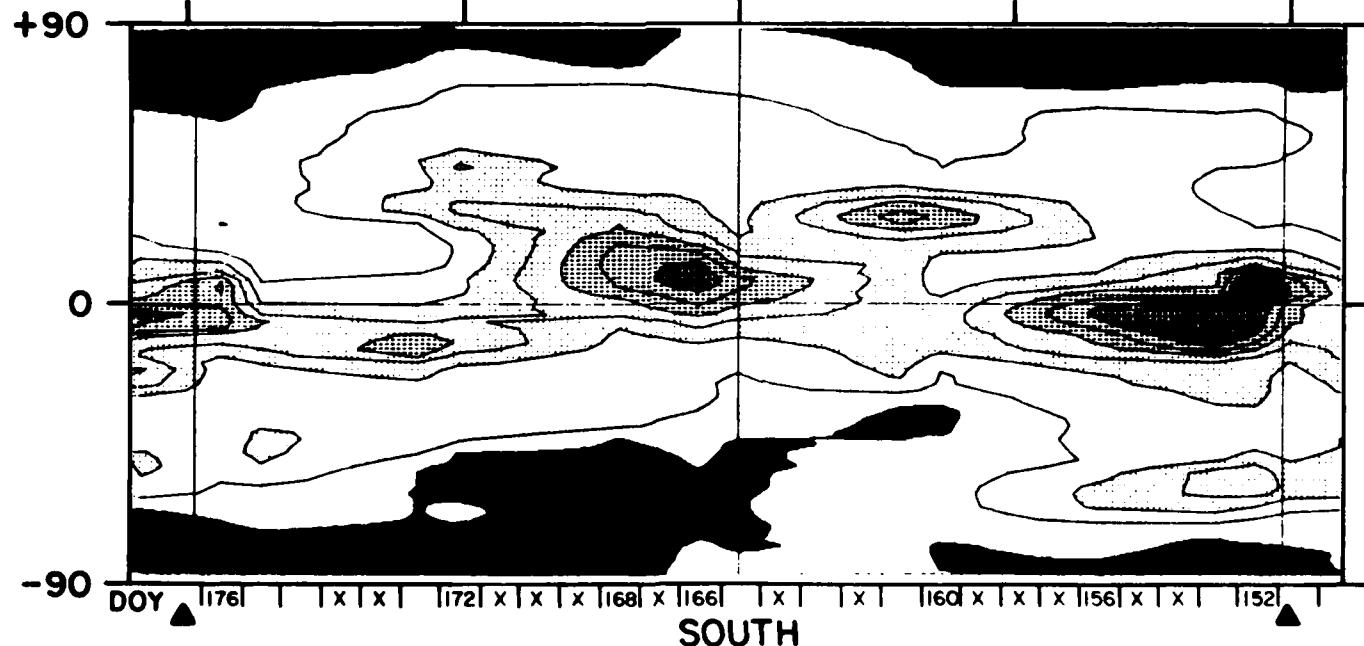
**EAST LIMB**

**NORTH**



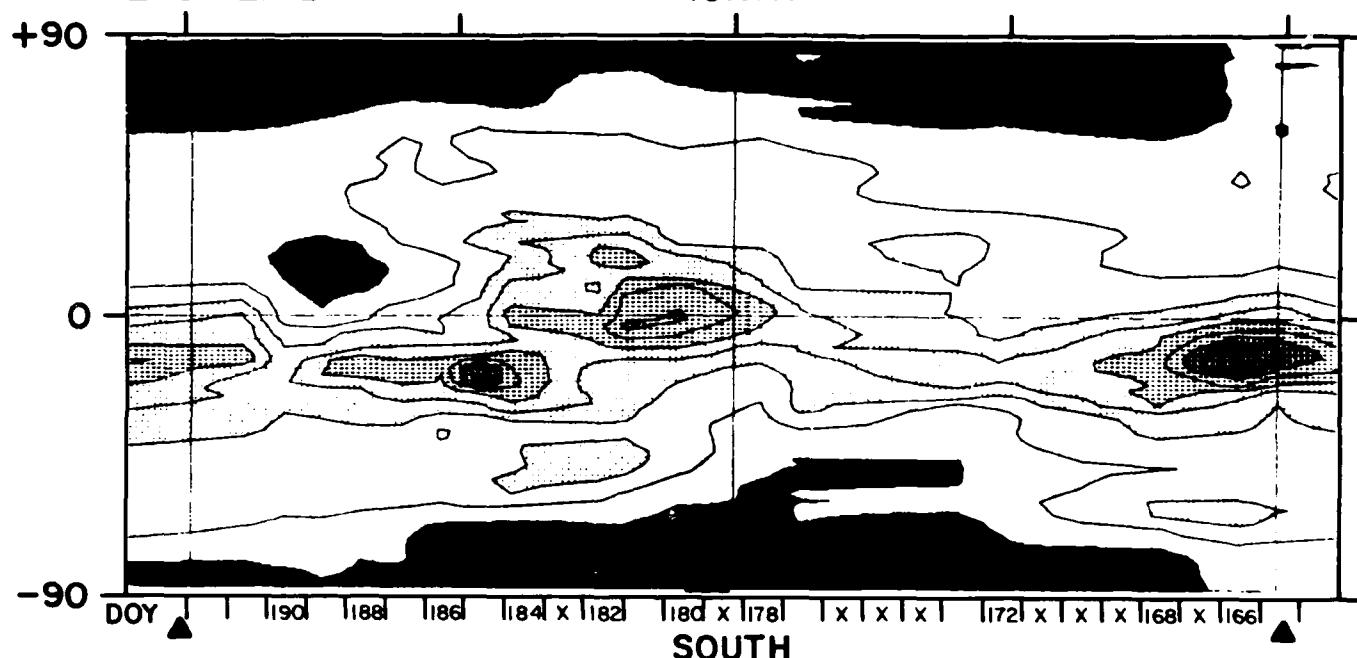
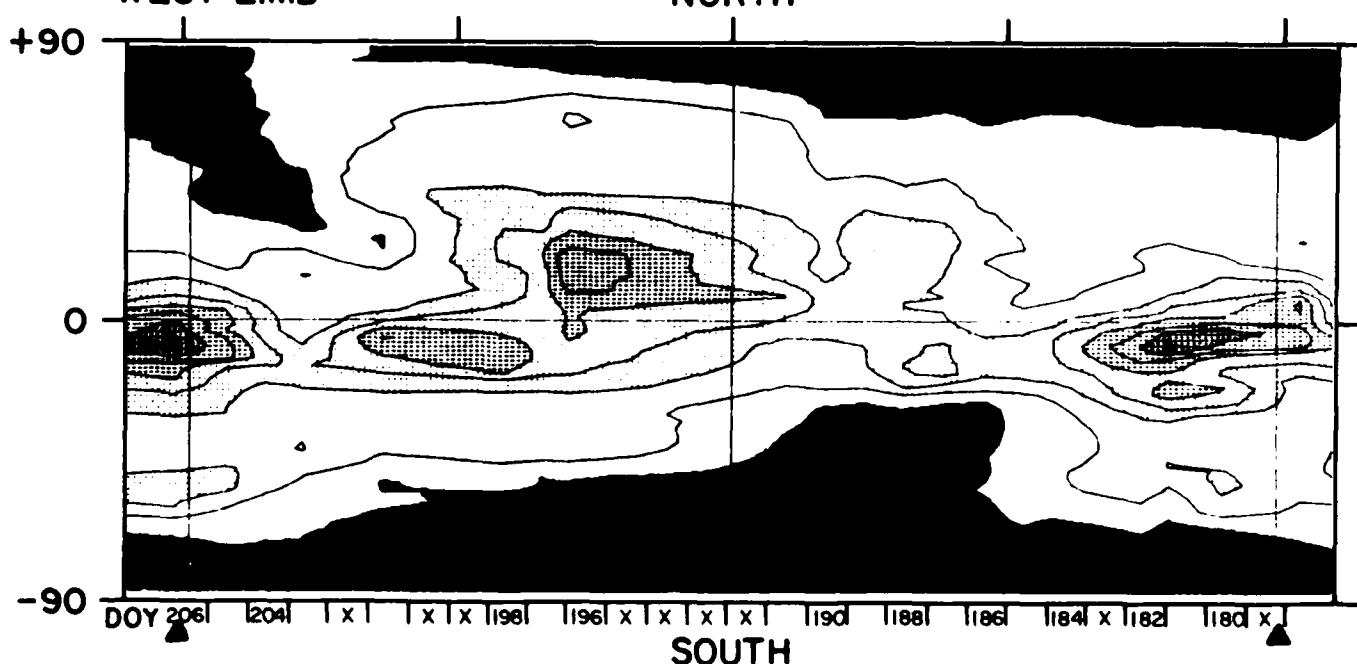
**WEST LIMB**

**NORTH**



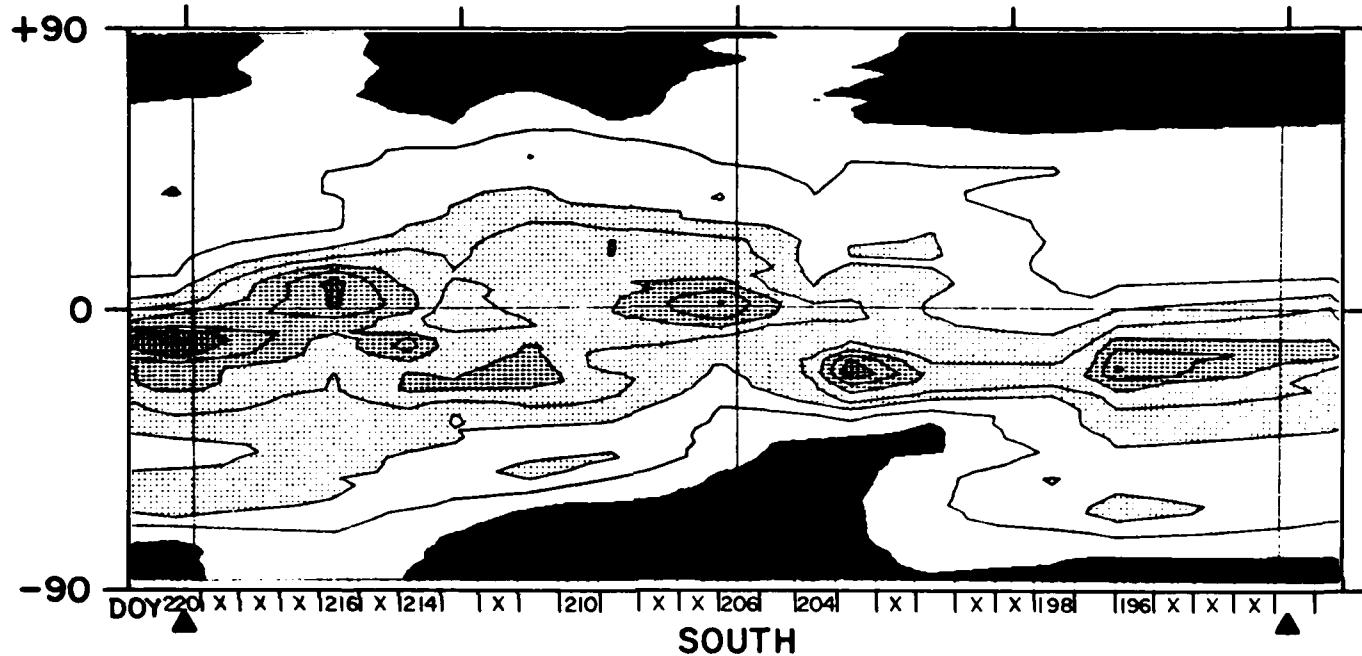
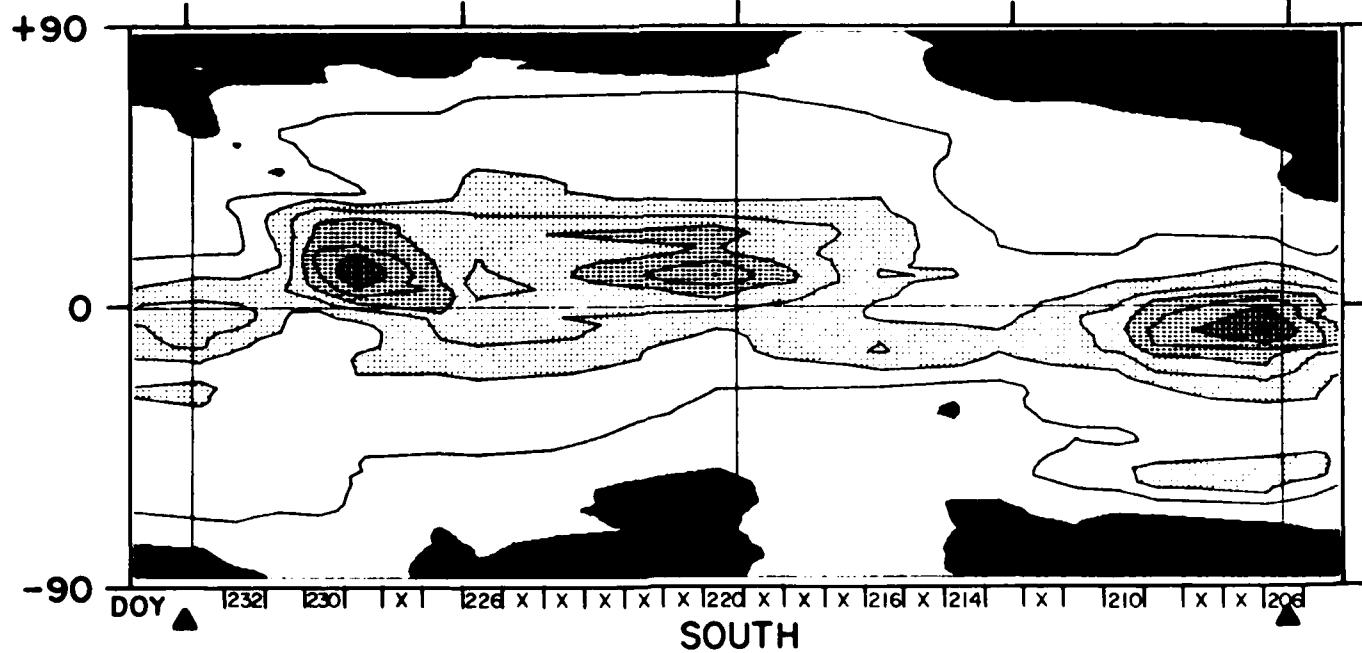
0 4 8 12 16 20 24 28 MIL

**X = NO DATA**

**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK****Fe XIV, 5303 Å CORONAL PHOTOMETER****ROTATION 1750 HEIGHT 1.15R<sub>o</sub> YEAR 1984****EAST LIMB****NORTH****WEST LIMB****NORTH**

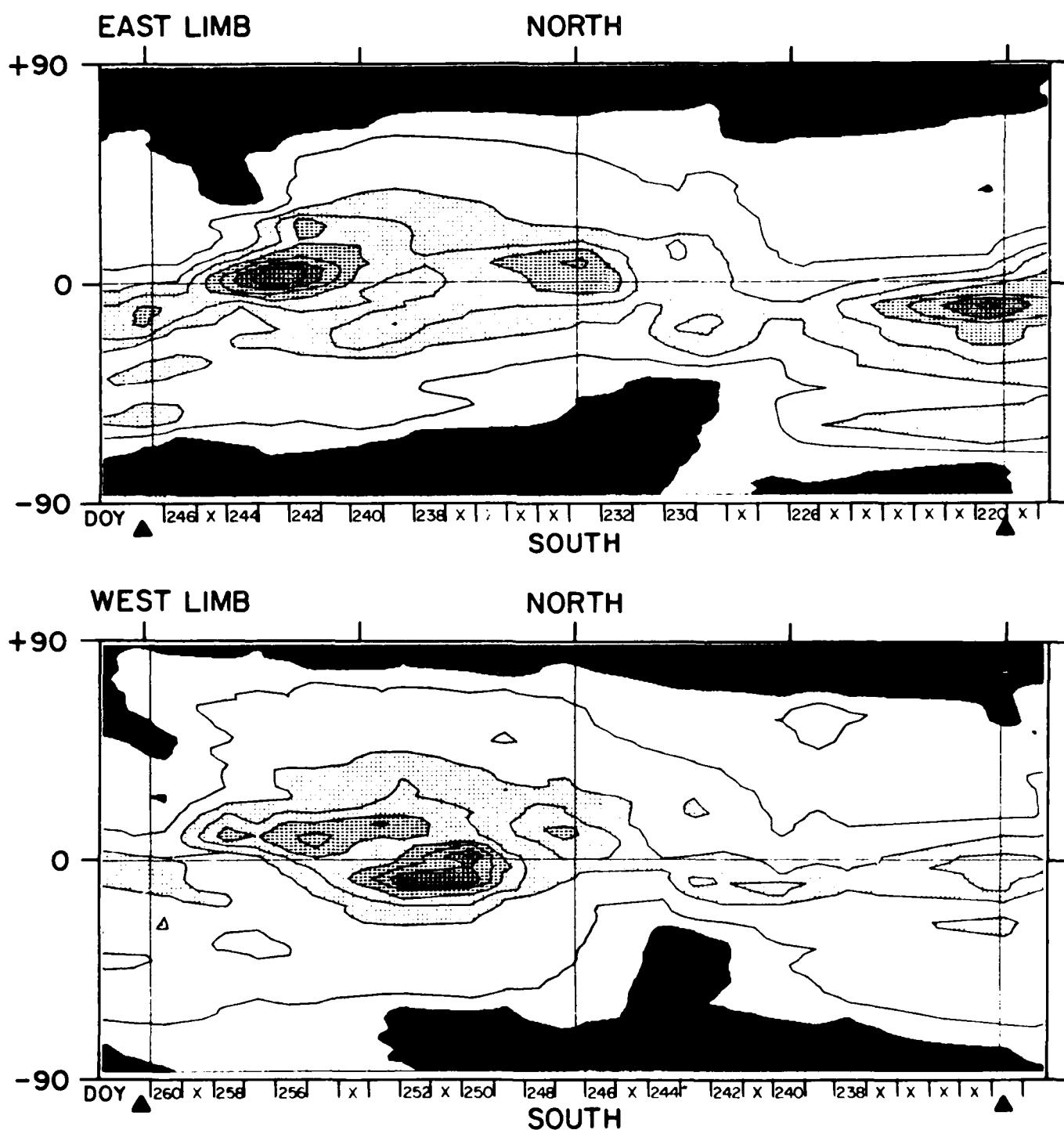
0 4 8 12 16 20 24 28 MIL  
[Scale bar markings: 0, 4, 8, 12, 16, 20, 24, 28]

X = NO DATA

**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK****Fe XIV, 5303 Å CORONAL PHOTOMETER****ROTATION 1751 HEIGHT 1.15 R<sub>o</sub> YEAR 1984****EAST LIMB****NORTH****WEST LIMB****NORTH**

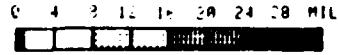
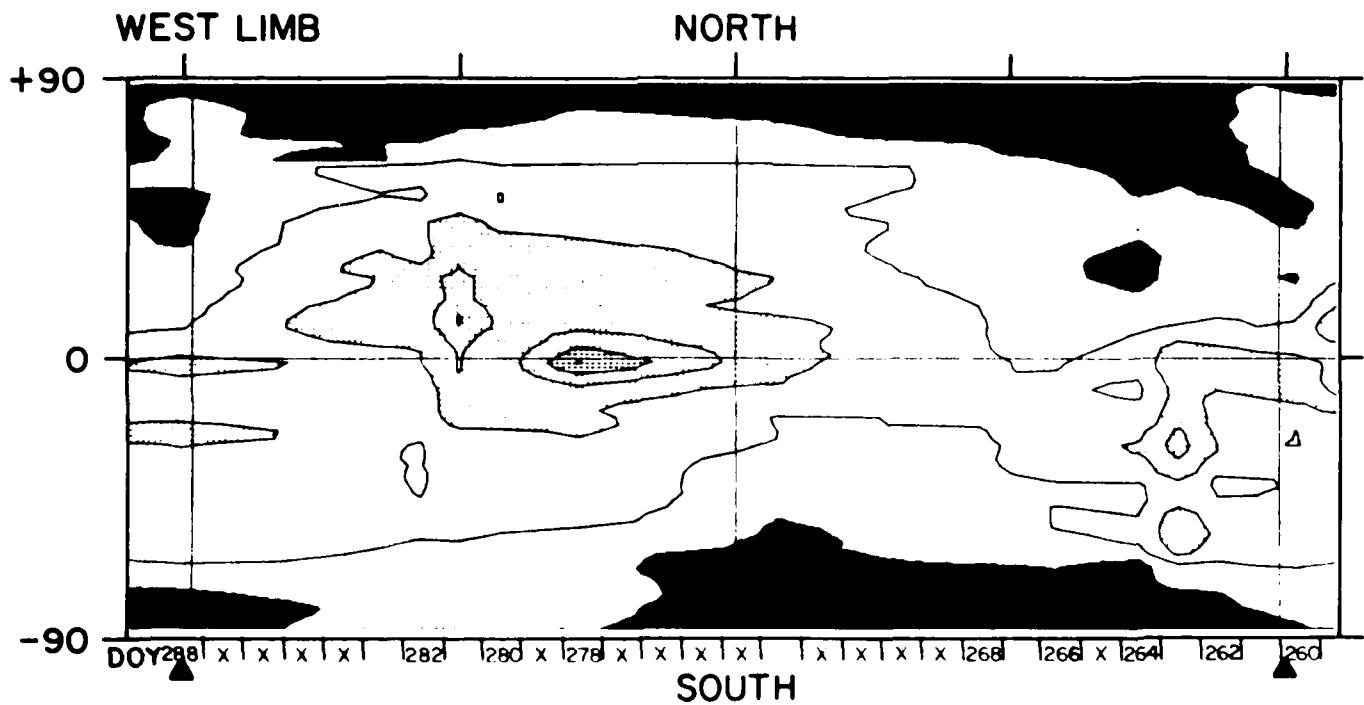
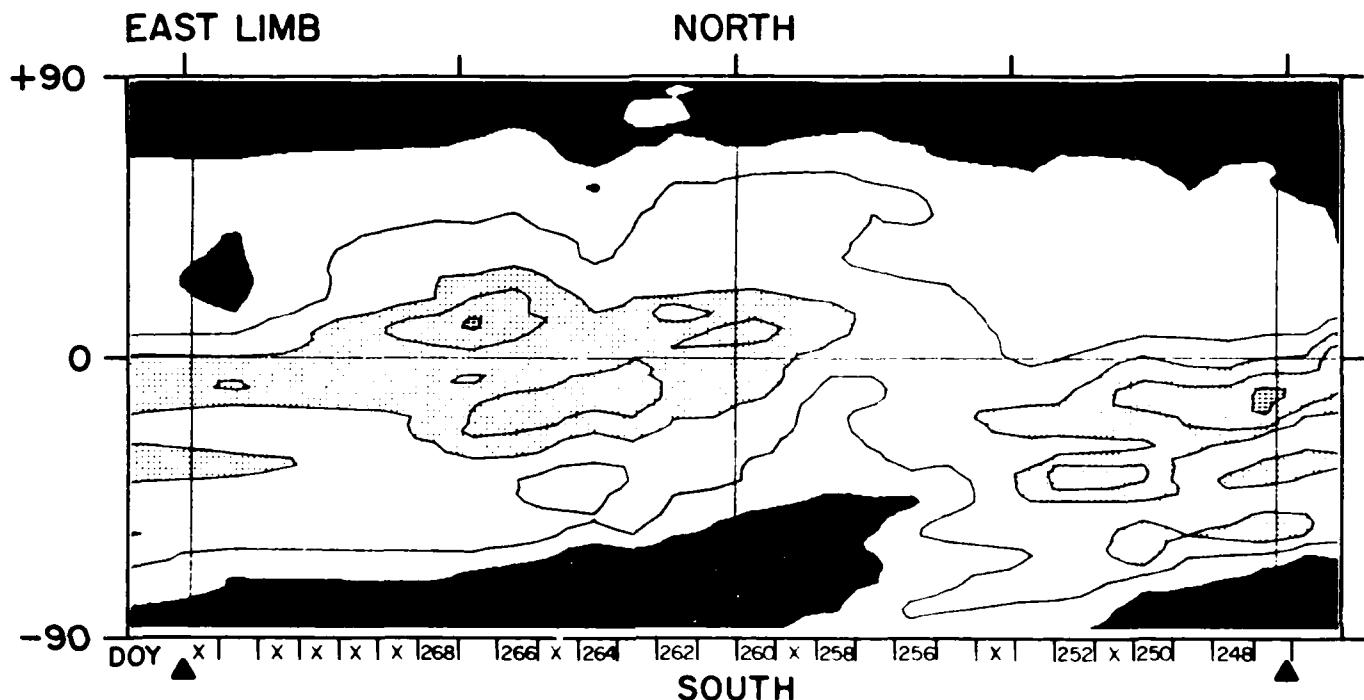
0 4 8 12 16 20 24 28 MIL  
[Scale bar markings: 0, 4, 8, 12, 16, 20, 24, 28]

X = NO DATA

**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK****Fe XIV, 5303 Å CORONAL PHOTOMETER****ROTATION 1752 HEIGHT 1.15R<sub>o</sub> YEAR 1984**

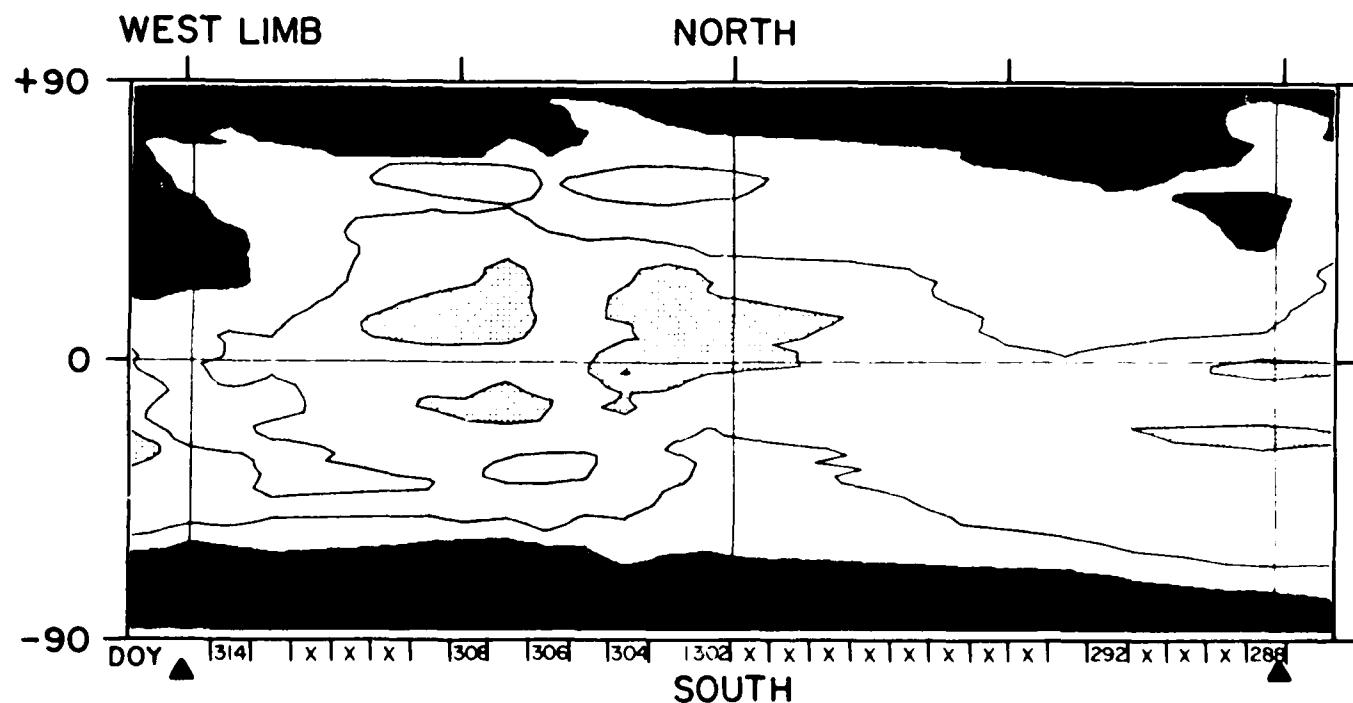
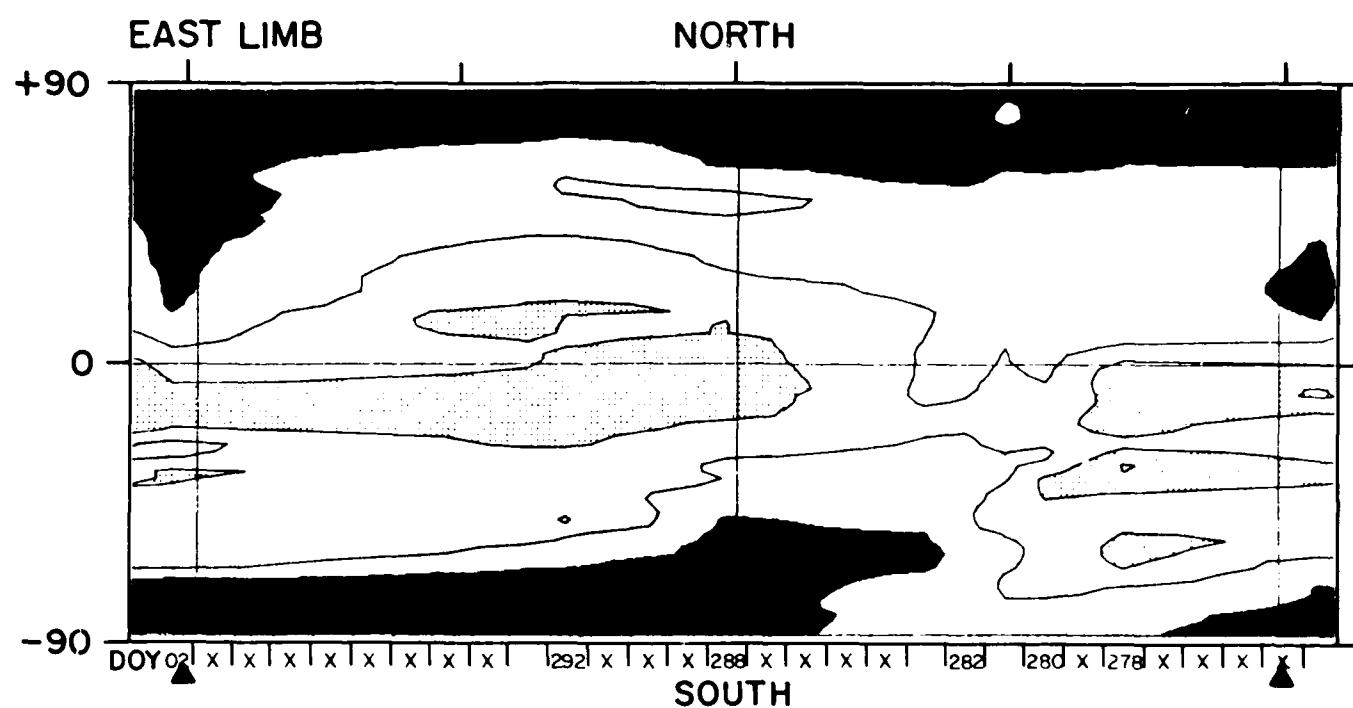
0 4 8 12 16 20 24 28 MIL  
south limb

X = NO DATA

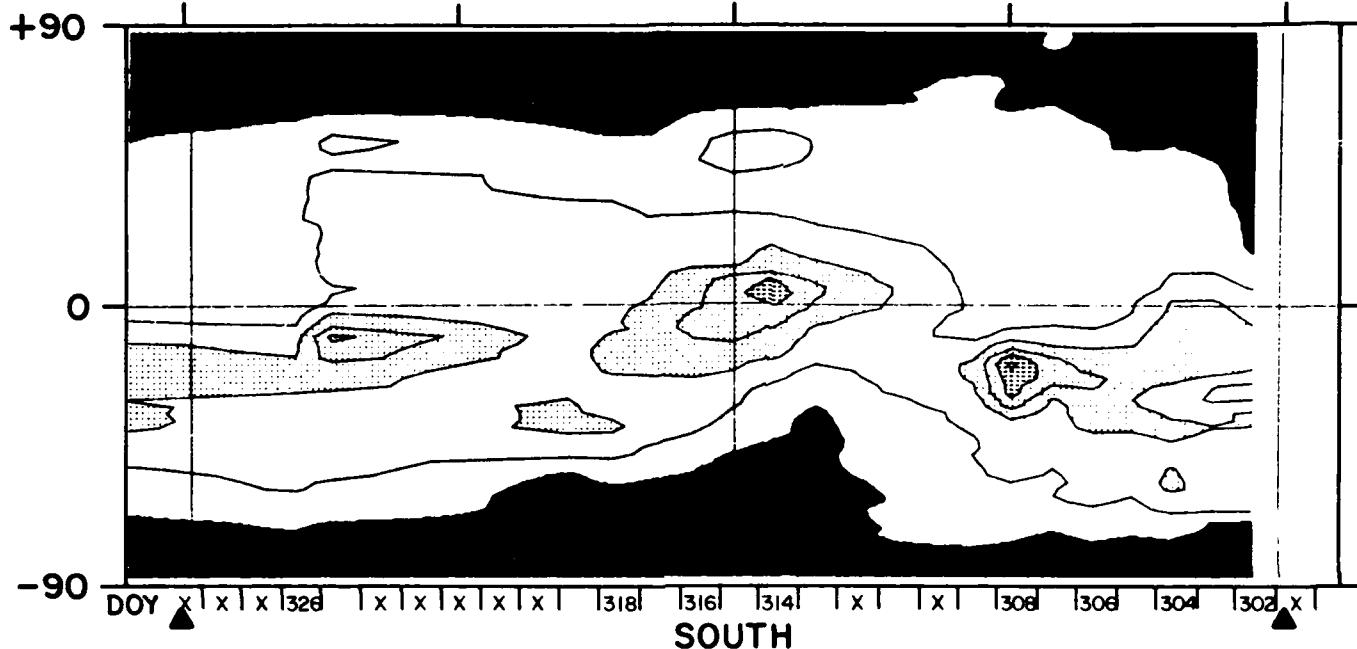
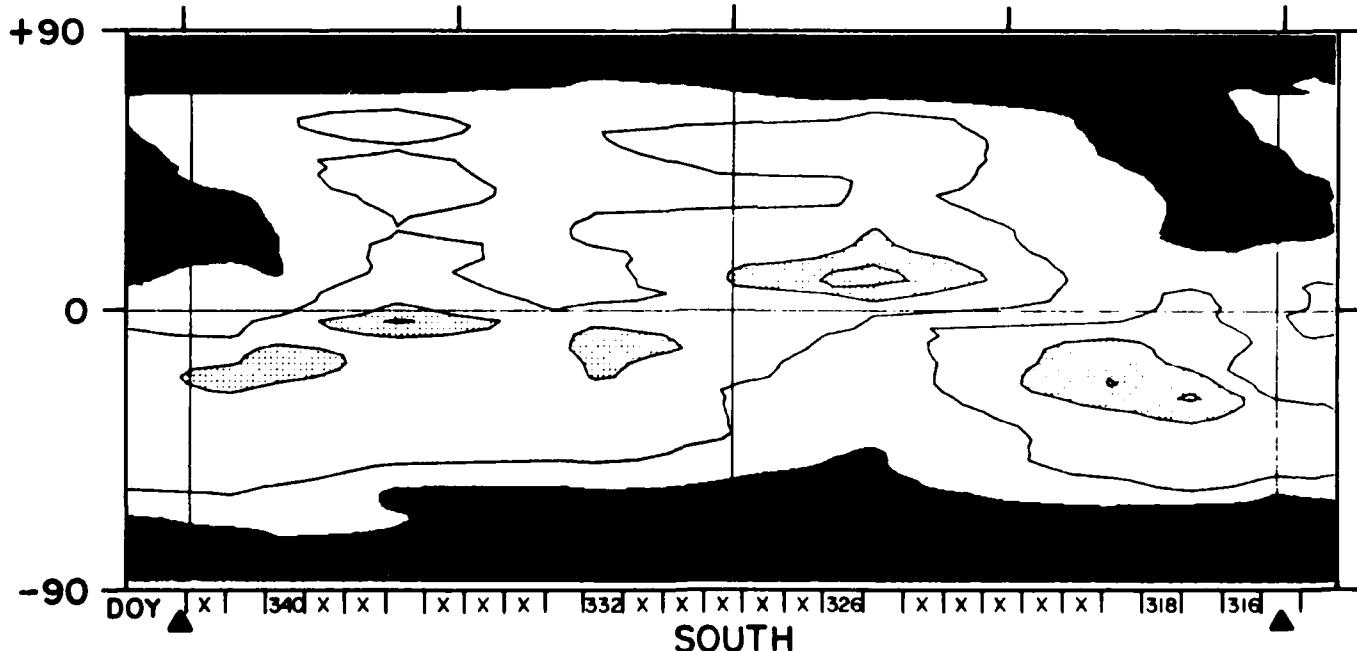
**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK****Fe XIV, 5303 Å CORONAL PHOTOMETER****ROTATION 1753 HEIGHT 1.15 R<sub>o</sub> YEAR 1984**

X = NO DATA

NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK  
 Fe XIV, 5303 Å CORONAL PHOTOMETER  
 ROTATION 1754 HEIGHT 1.15 R<sub>o</sub> YEAR 1984



X = NO DATA

**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK****Fe XIV, 5303 Å CORONAL PHOTOMETER****ROTATION 1755 HEIGHT 1.15 R<sub>o</sub> YEAR 1984****EAST LIMB****NORTH****WEST LIMB****NORTH****X = NO DATA**

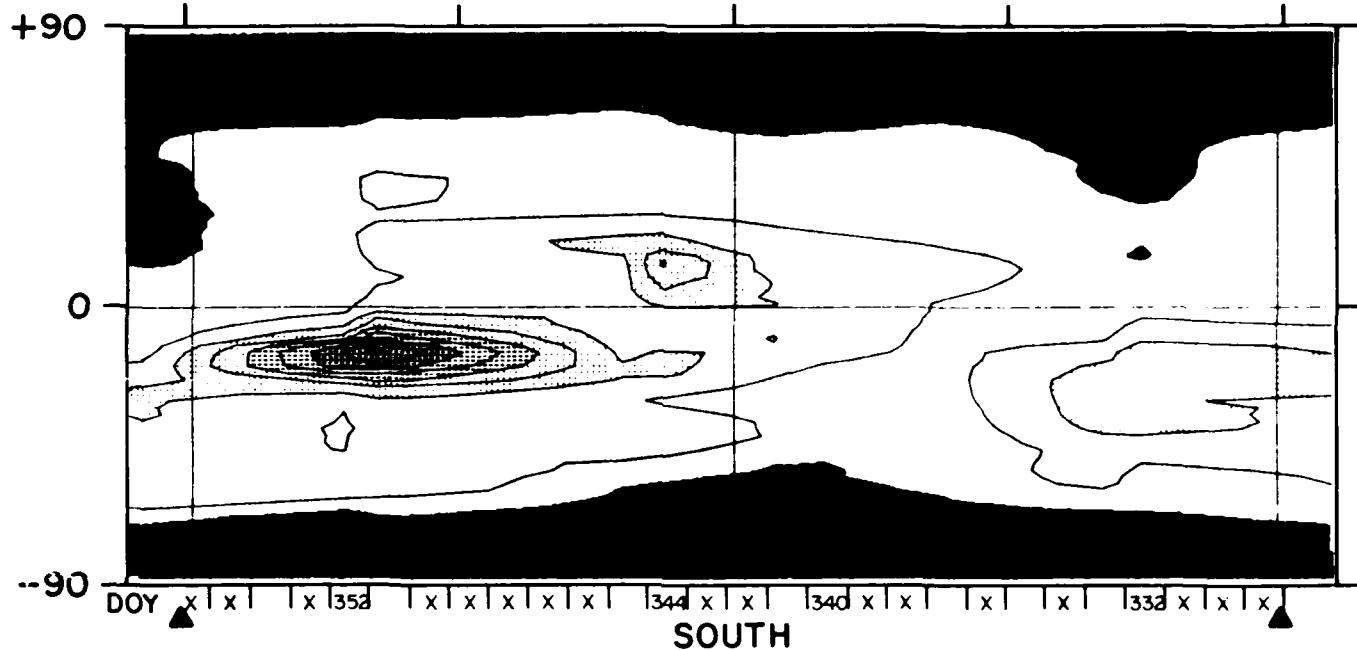
# NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1756 HEIGHT 1.15R<sub>o</sub> YEAR 1984

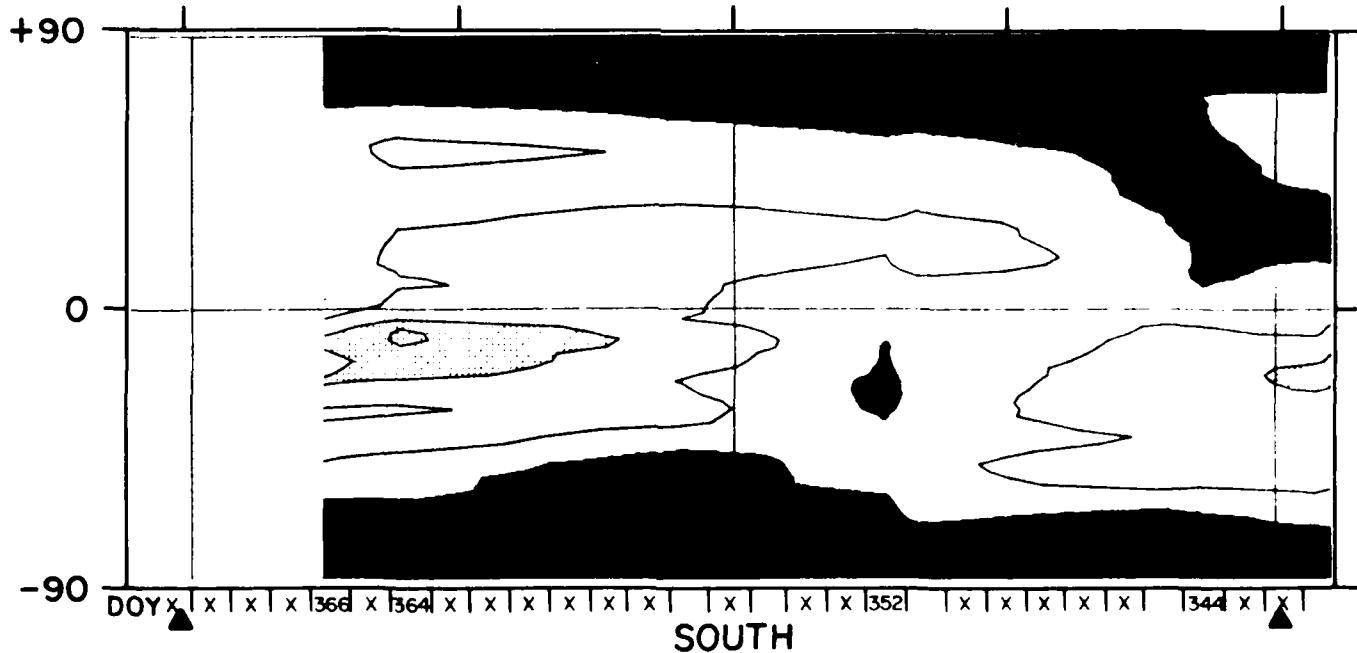
EAST LIMB

NORTH



WEST LIMB

NORTH



0 4 8 12 16 20 24 28 MIL



X = NO DATA

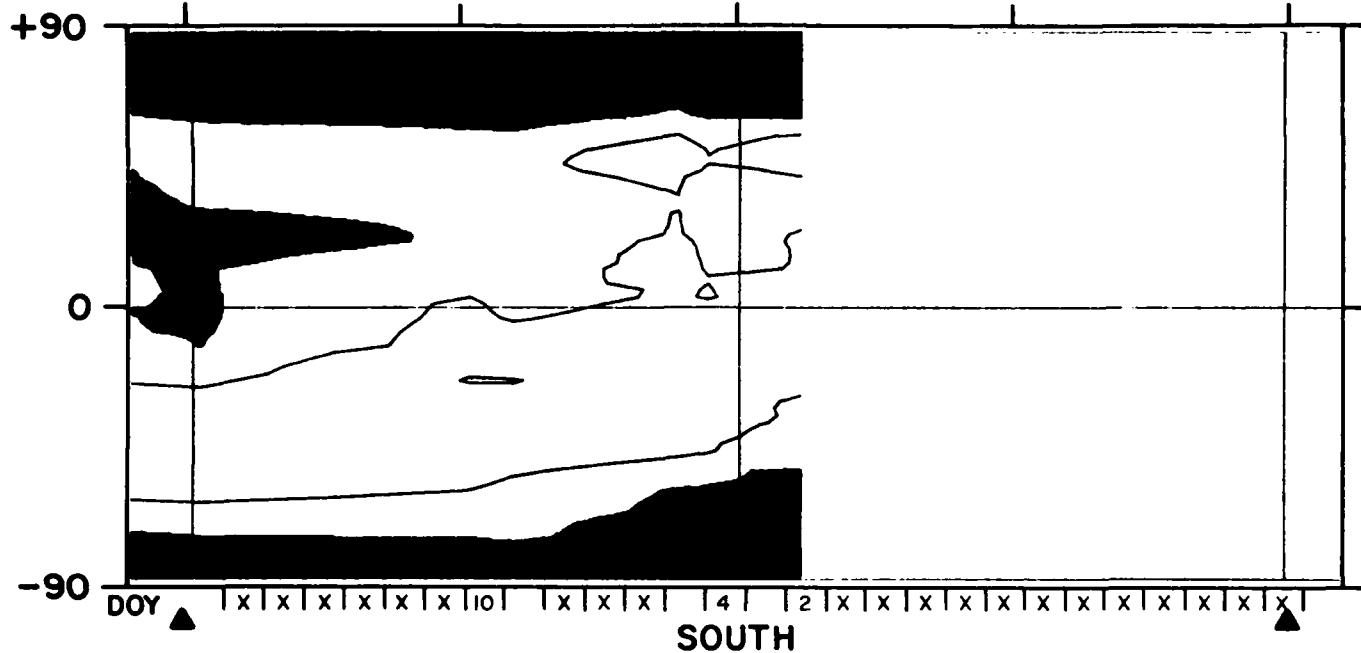
**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK**

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1757 HEIGHT 1.15 R<sub>⊕</sub> YEAR 1985

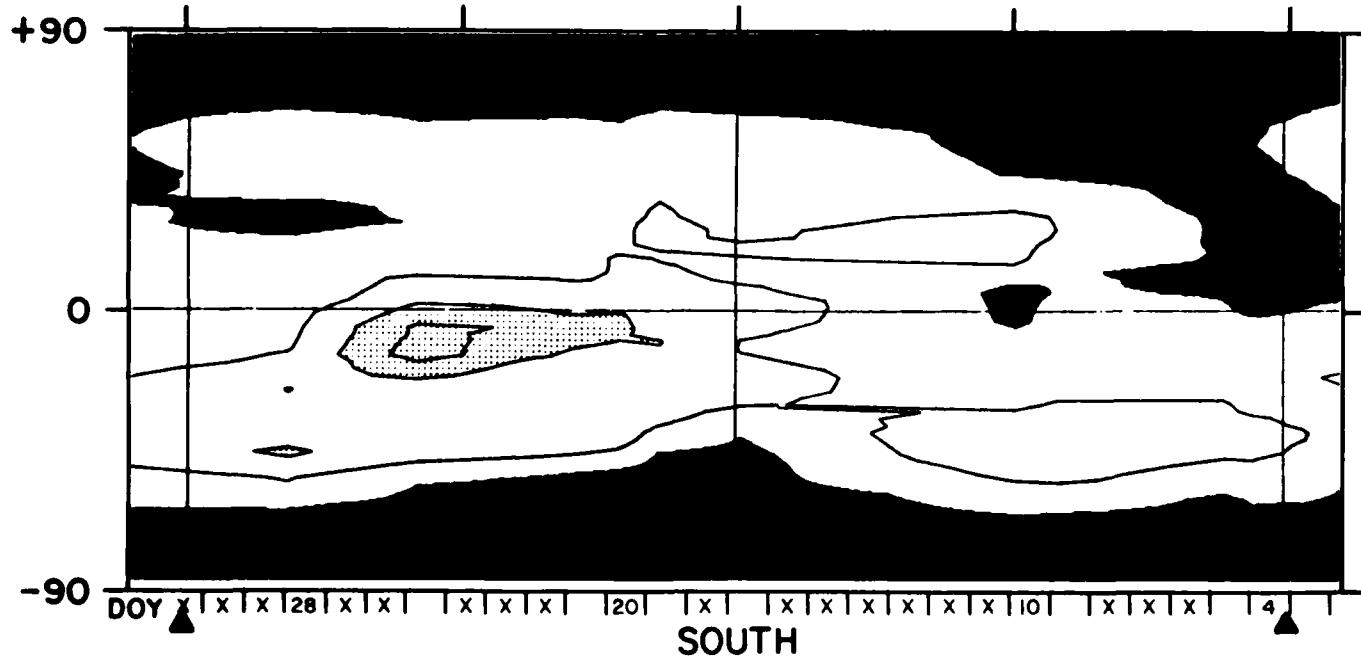
EAST LIMB

NORTH



WEST LIMB

NORTH



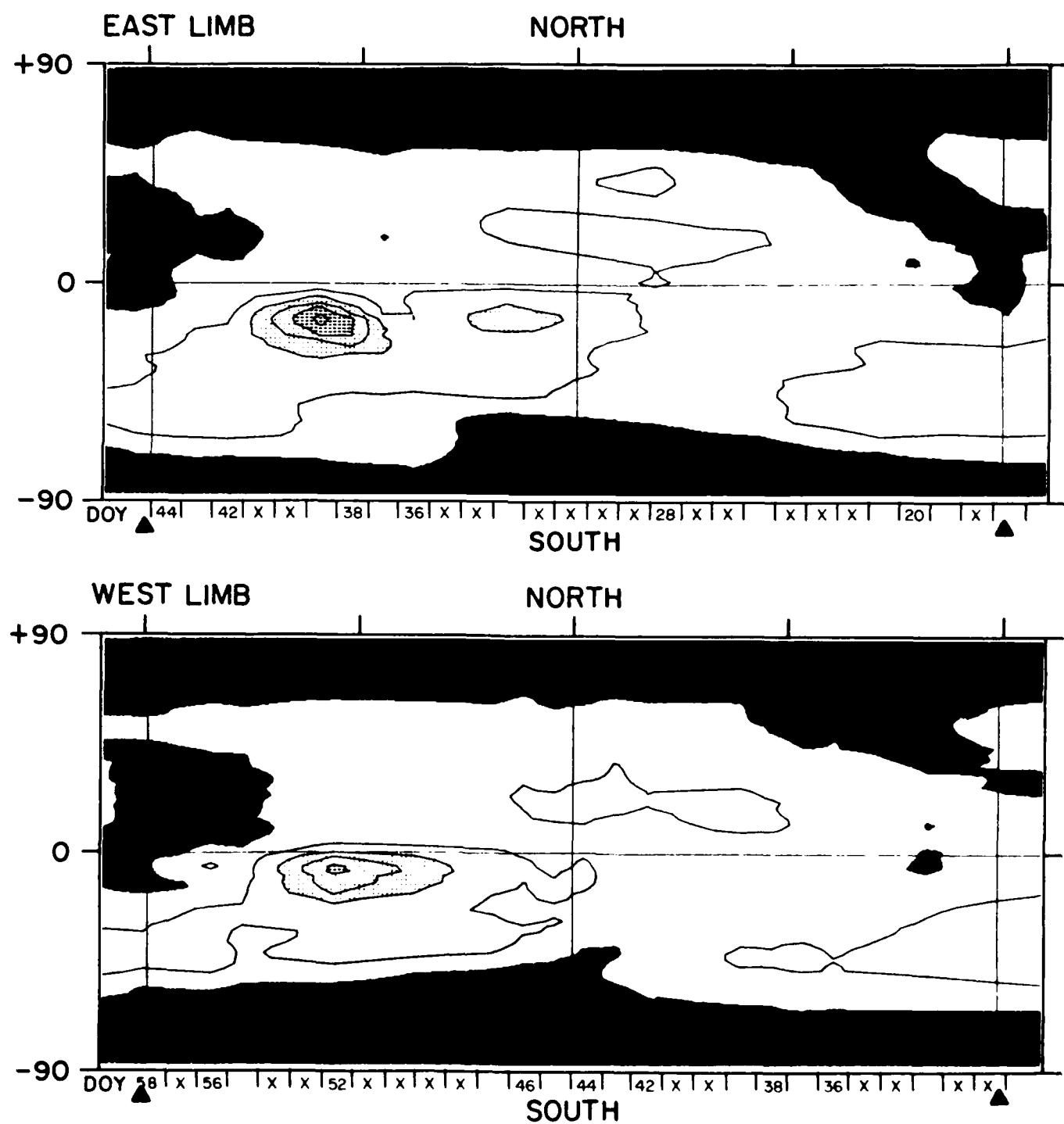
0 4 8 12 16 20 24 28 MIL

X = NO DATA

NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1758 HEIGHT 1.15 R<sub>o</sub> YEAR 1985



0 4 8 12 16 20 24 28 MIL  
[A grayscale bar with tick marks at 0, 4, 8, 12, 16, 20, 24, 28, and a label 'MIL' at the end.]

X = NO DATA

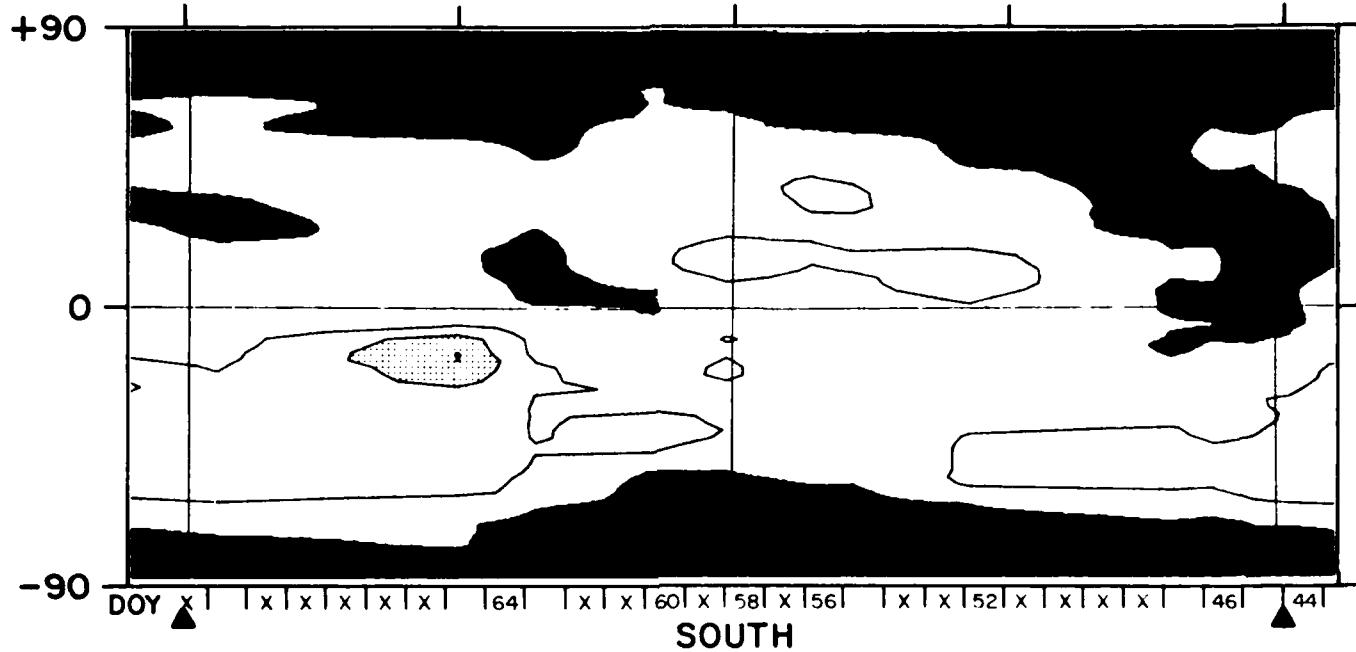
# NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1759 HEIGHT 1.15R<sub>o</sub> YEAR 1985

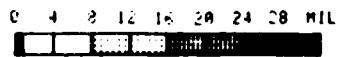
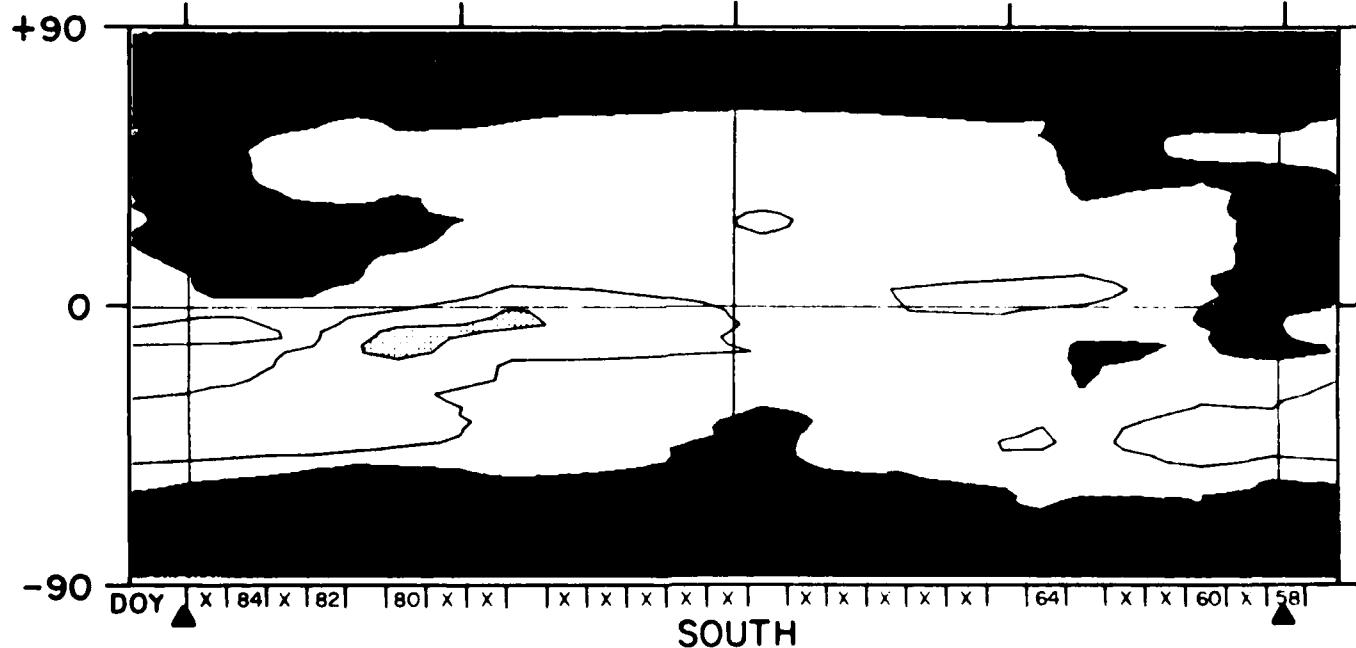
EAST LIMB

NORTH



WEST LIMB

NORTH

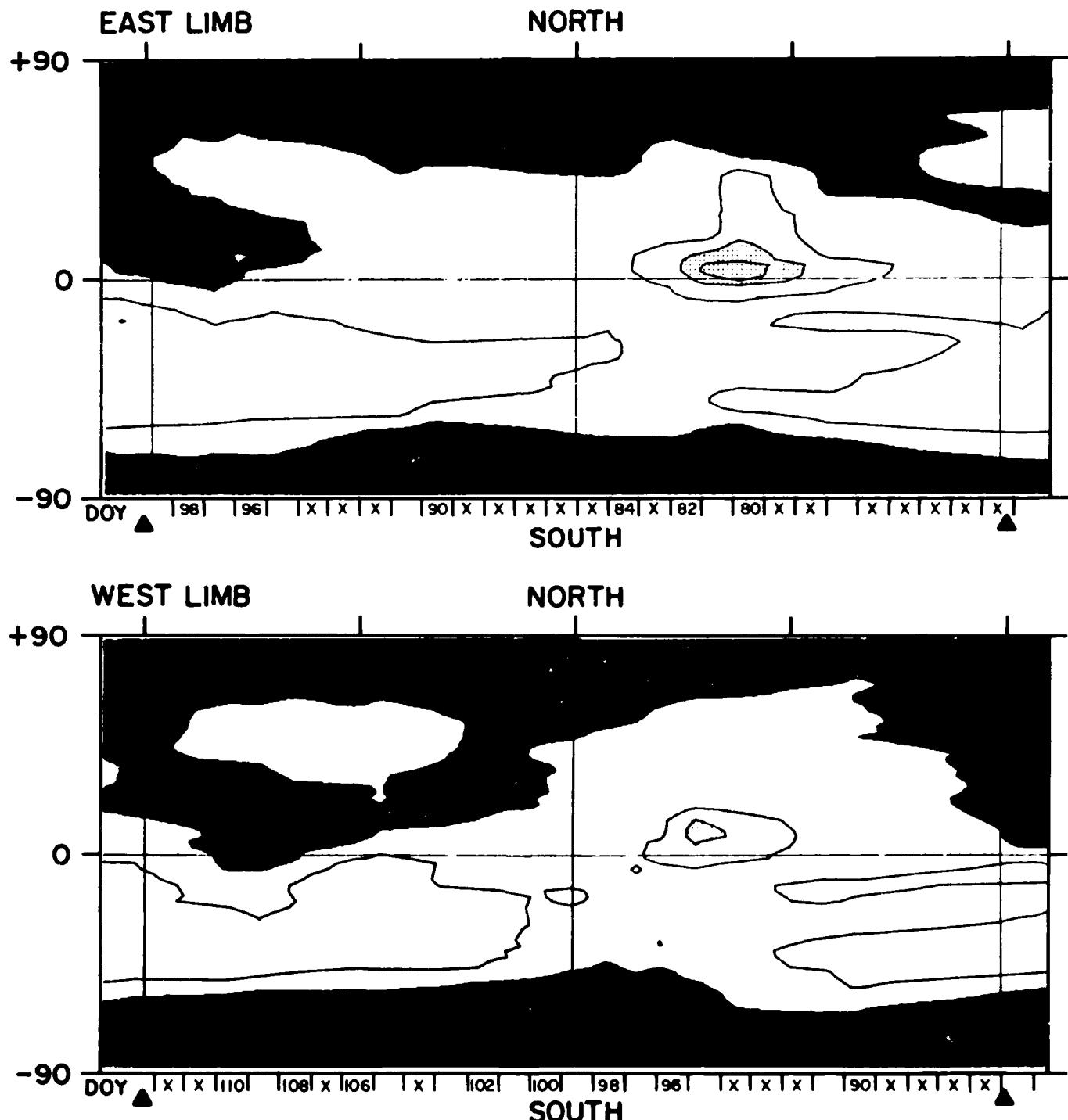


X = NO DATA

NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1760 HEIGHT 1.15R<sub>•</sub> YEAR 1985



0 4 8 12 16 20 24 28 MIL

X = NO DATA

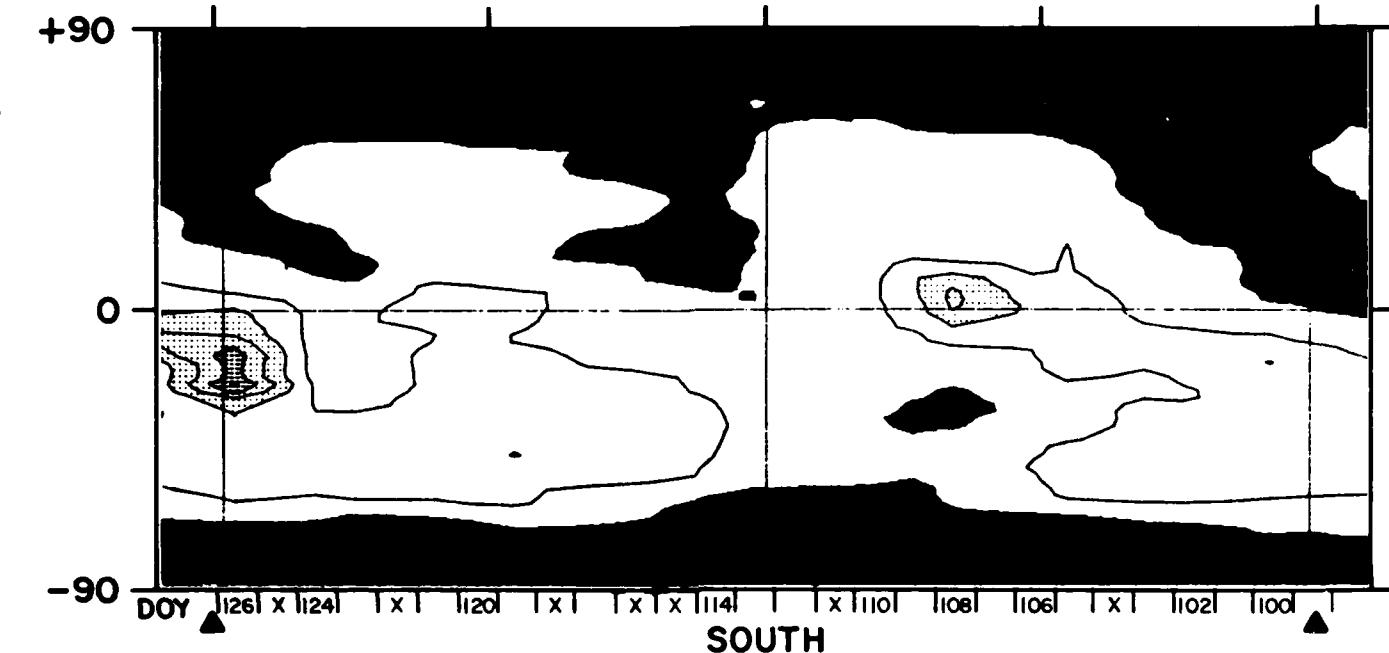
# NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1761 HEIGHT 1.15 R<sub>o</sub> YEAR 1985

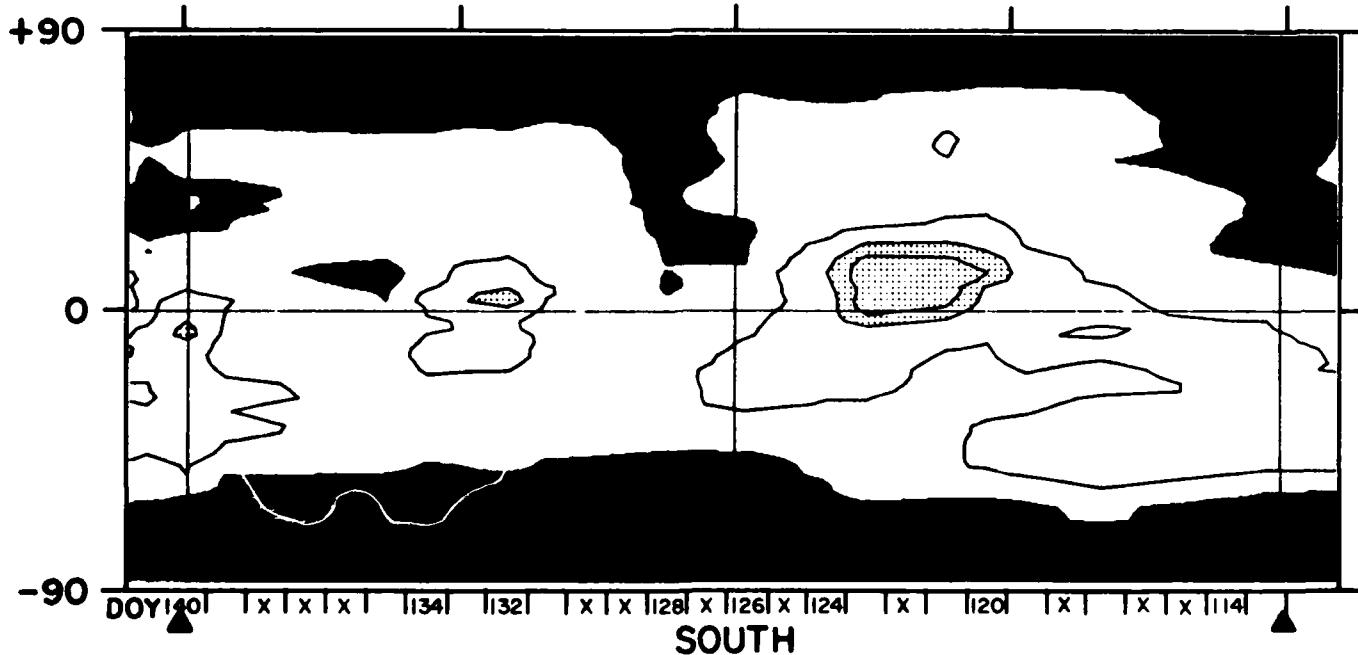
EAST LIMB

NORTH

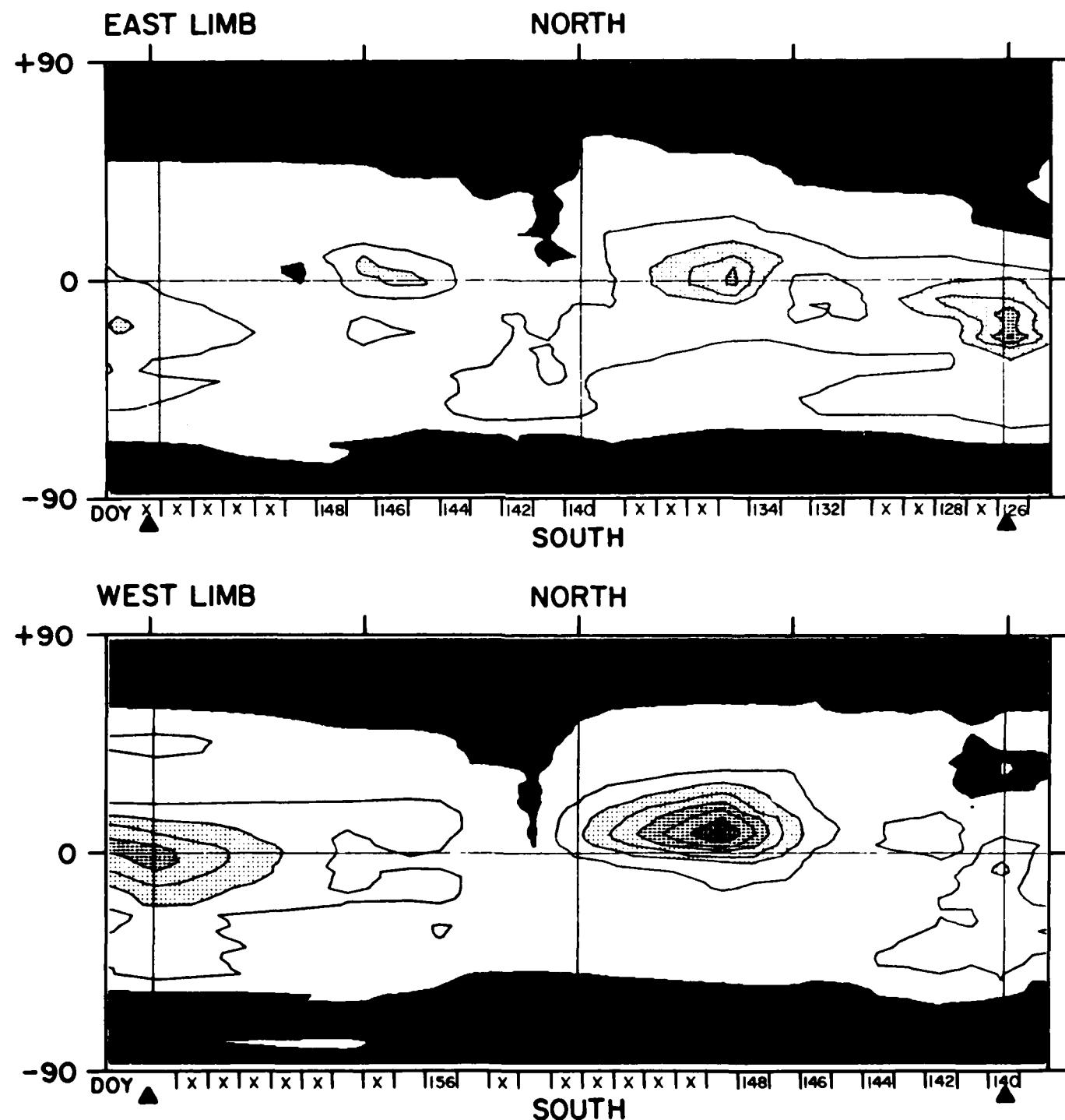


WEST LIMB

NORTH



X = NO DATA

**NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK****Fe XIV, 5303 Å CORONAL PHOTOMETER****ROTATION 1762 HEIGHT 1.15 R<sub>⊕</sub> YEAR 1985**

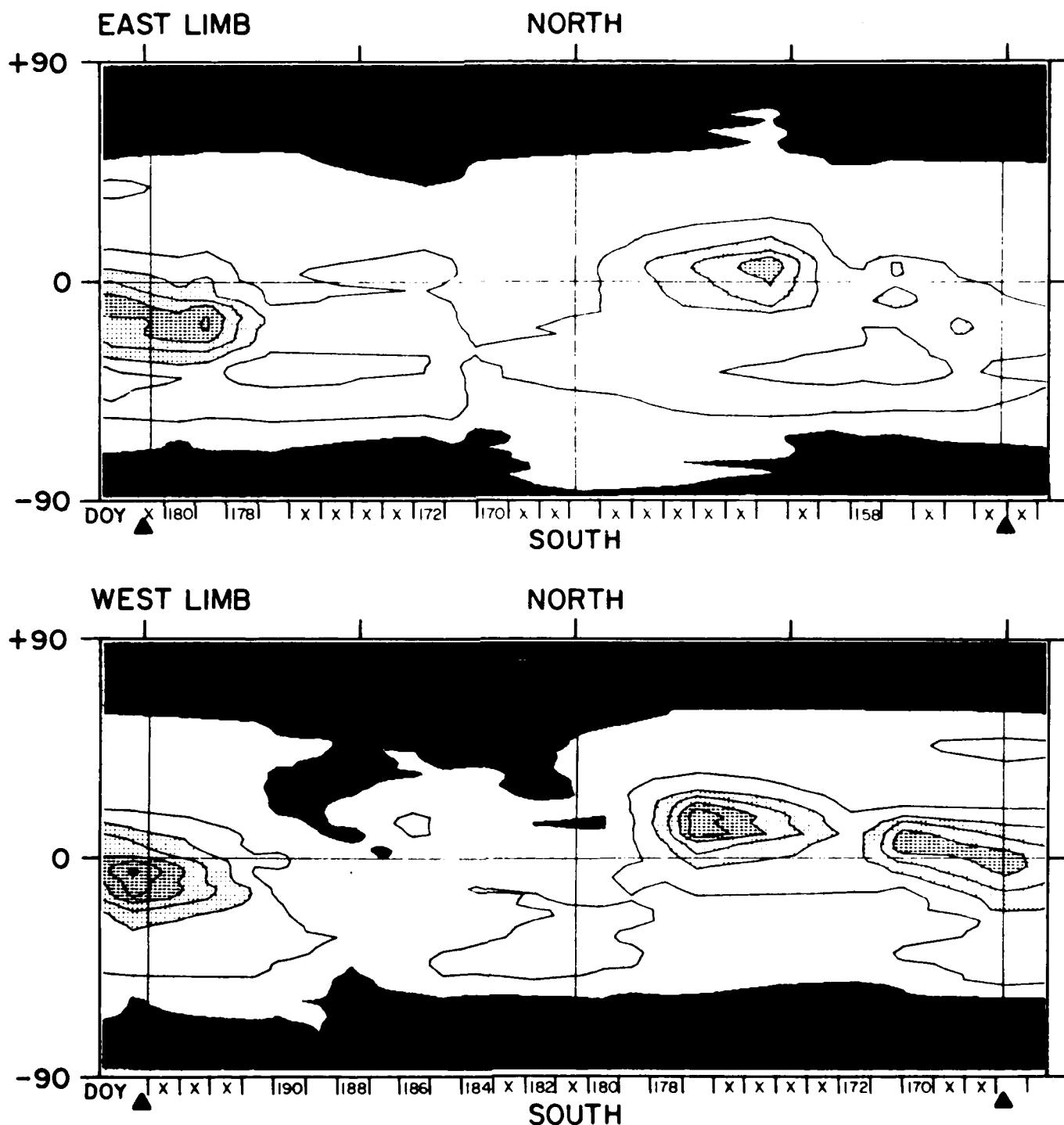
0 4 8 12 16 20 24 28 MIL  
[A grayscale bar with tick marks at 0, 4, 8, 12, 16, 20, 24, 28 MIL]

X = NO DATA

NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1763 HEIGHT 1.15 R<sub>⊕</sub> YEAR 1985

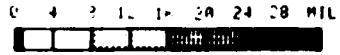
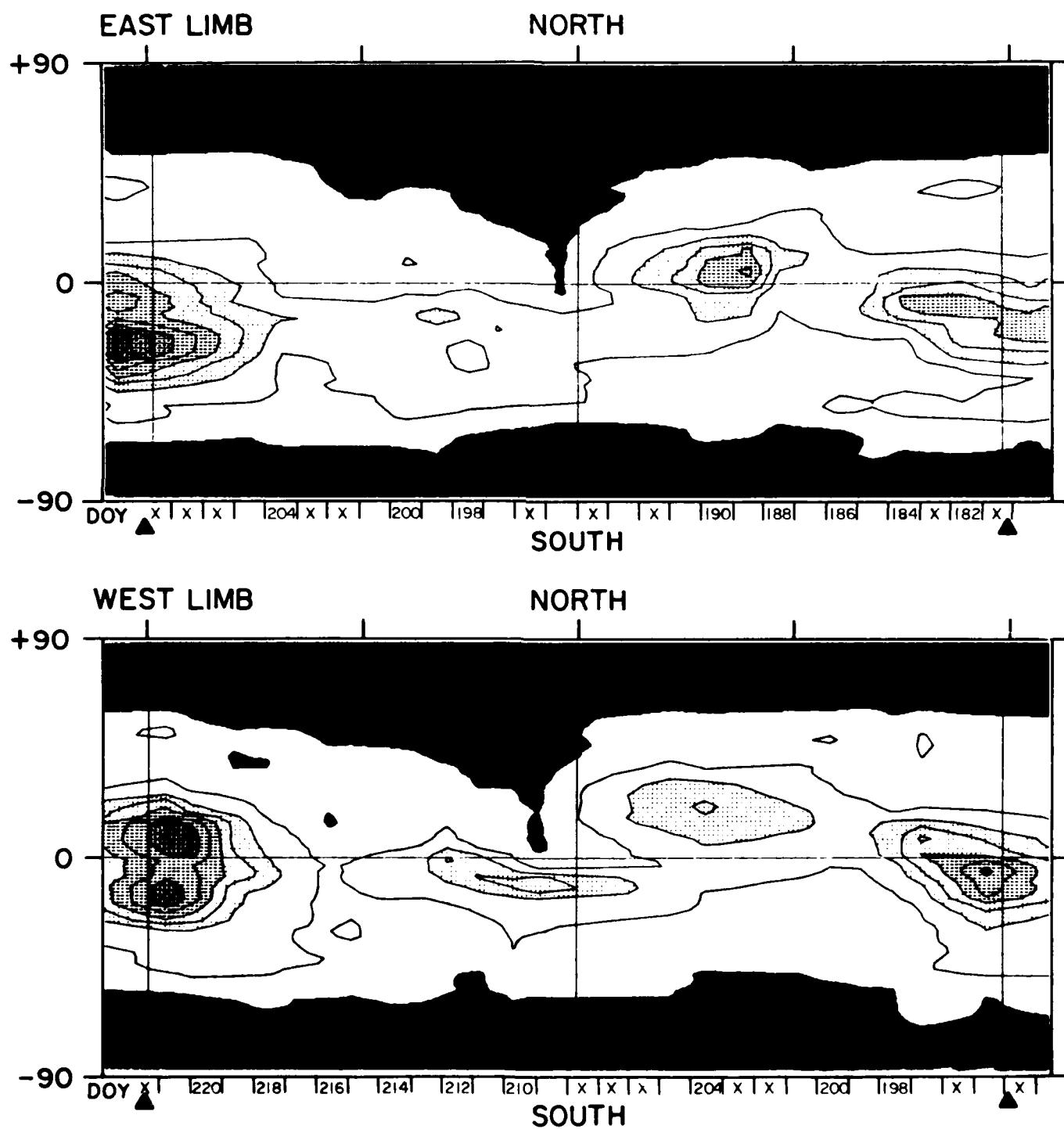


X = NO DATA

# NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1764 HEIGHT 1.15 R<sub>o</sub> YEAR 1985

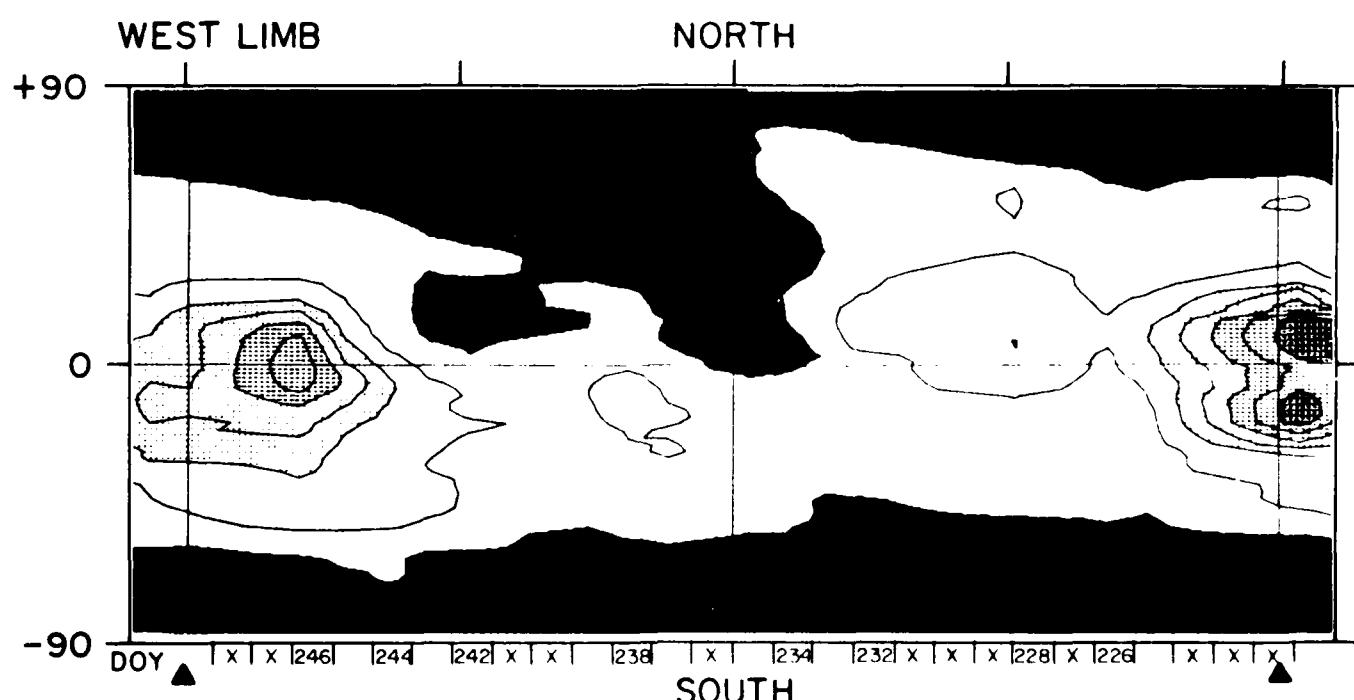
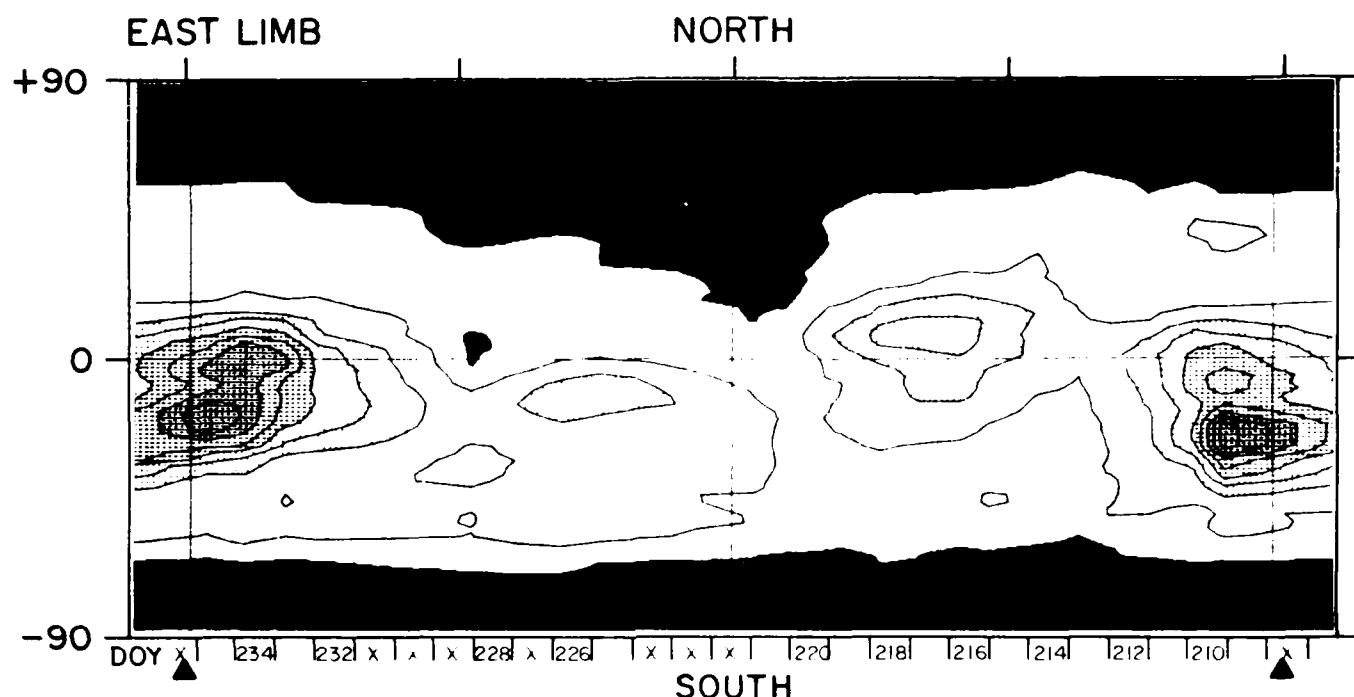


X = NO DATA

# NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1765 HEIGHT 1.15 R<sub>⊕</sub> YEAR 1985



X = NO DATA

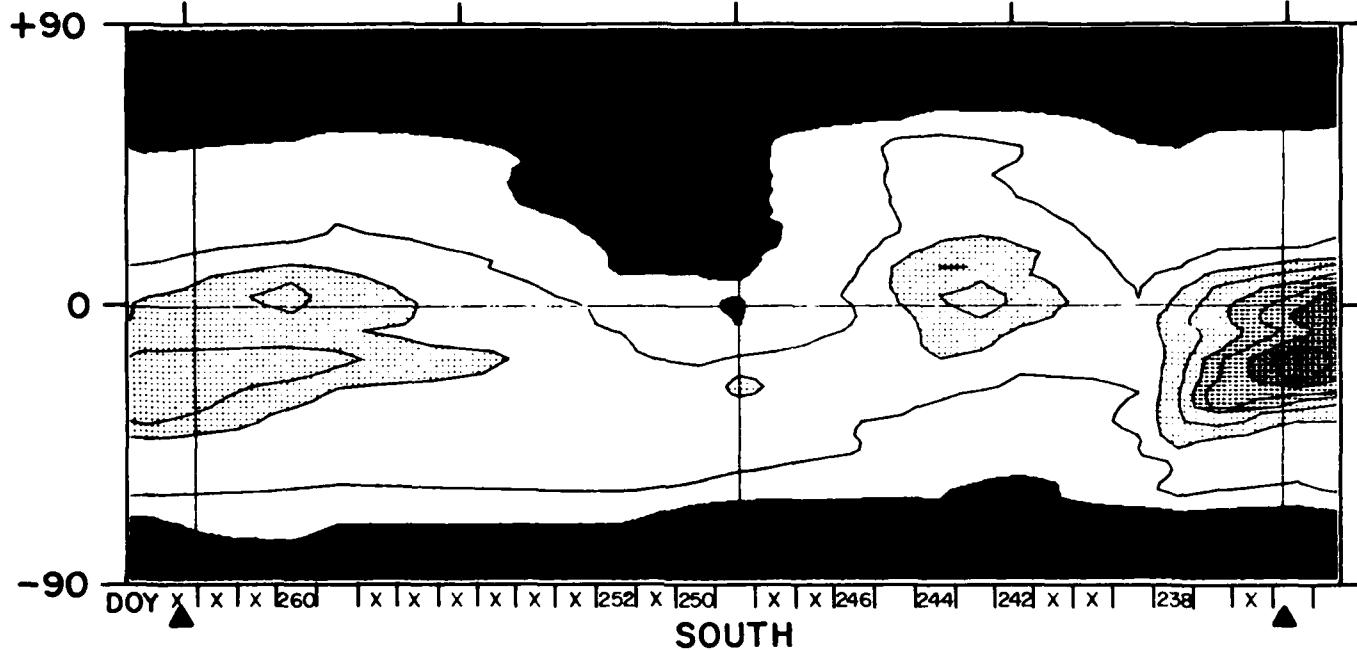
# NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1766 HEIGHT 1.15 R<sub>⊕</sub> YEAR 1985

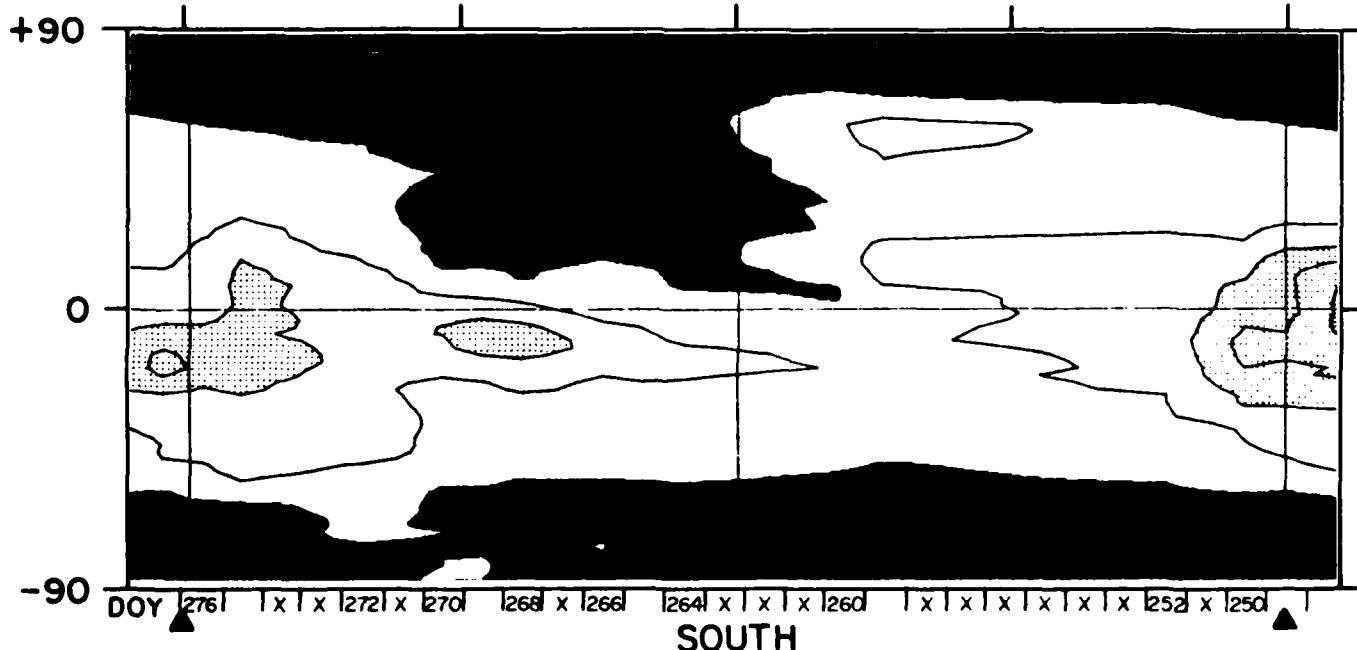
EAST LIMB

NORTH



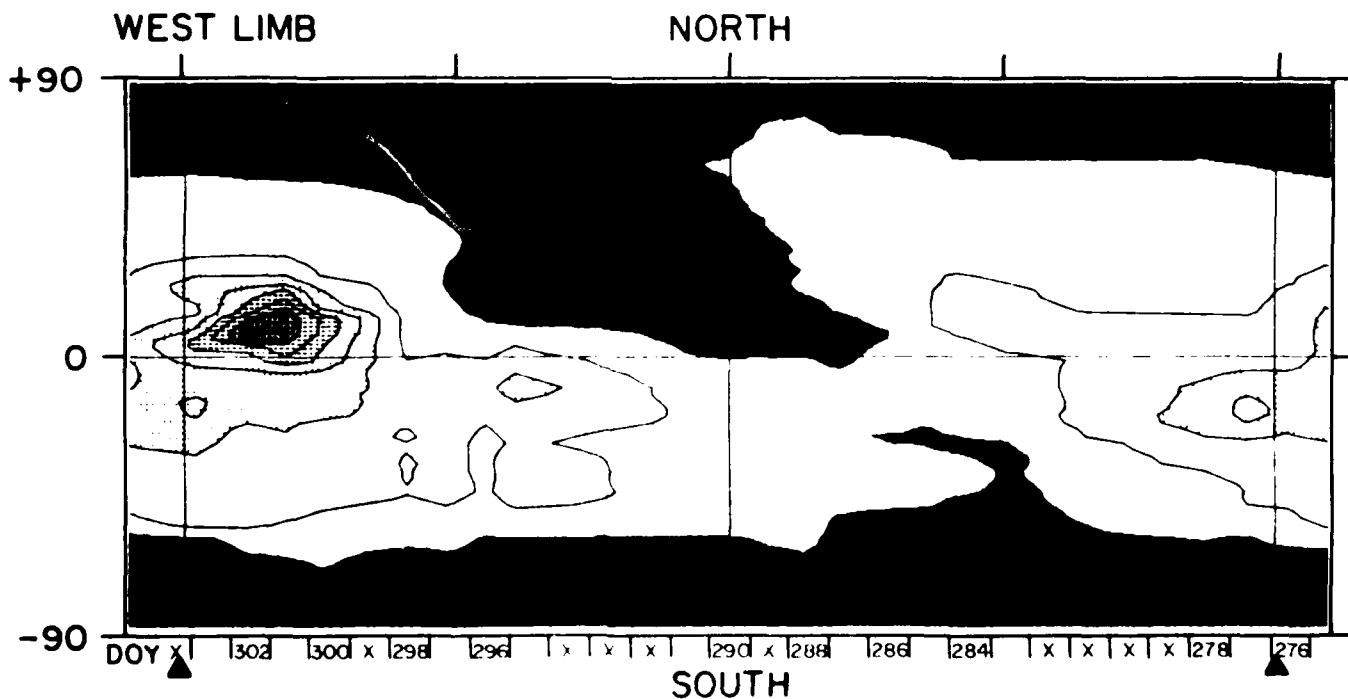
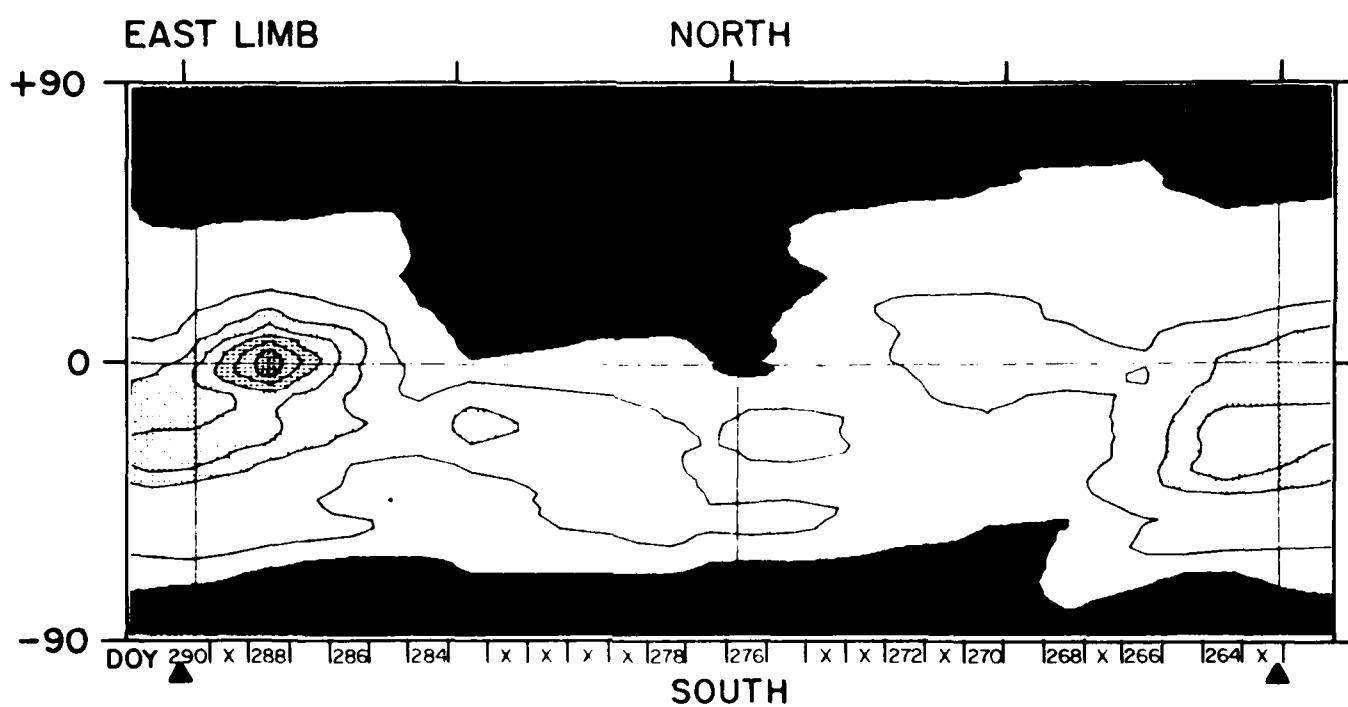
WEST LIMB

NORTH



X = NO DATA

NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK  
 Fe XIV, 5303 Å CORONAL PHOTOMETER  
 ROTATION 1767 HEIGHT 1.15 R<sub>⊕</sub> YEAR 1985



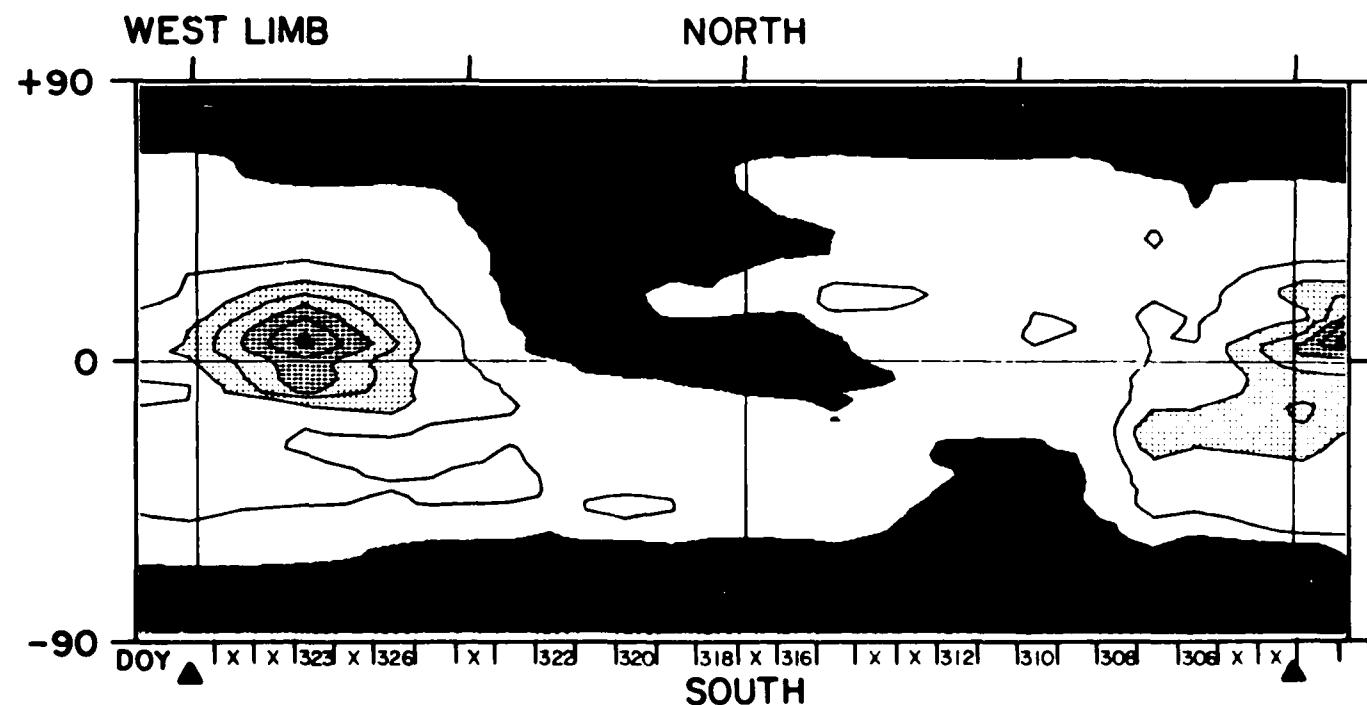
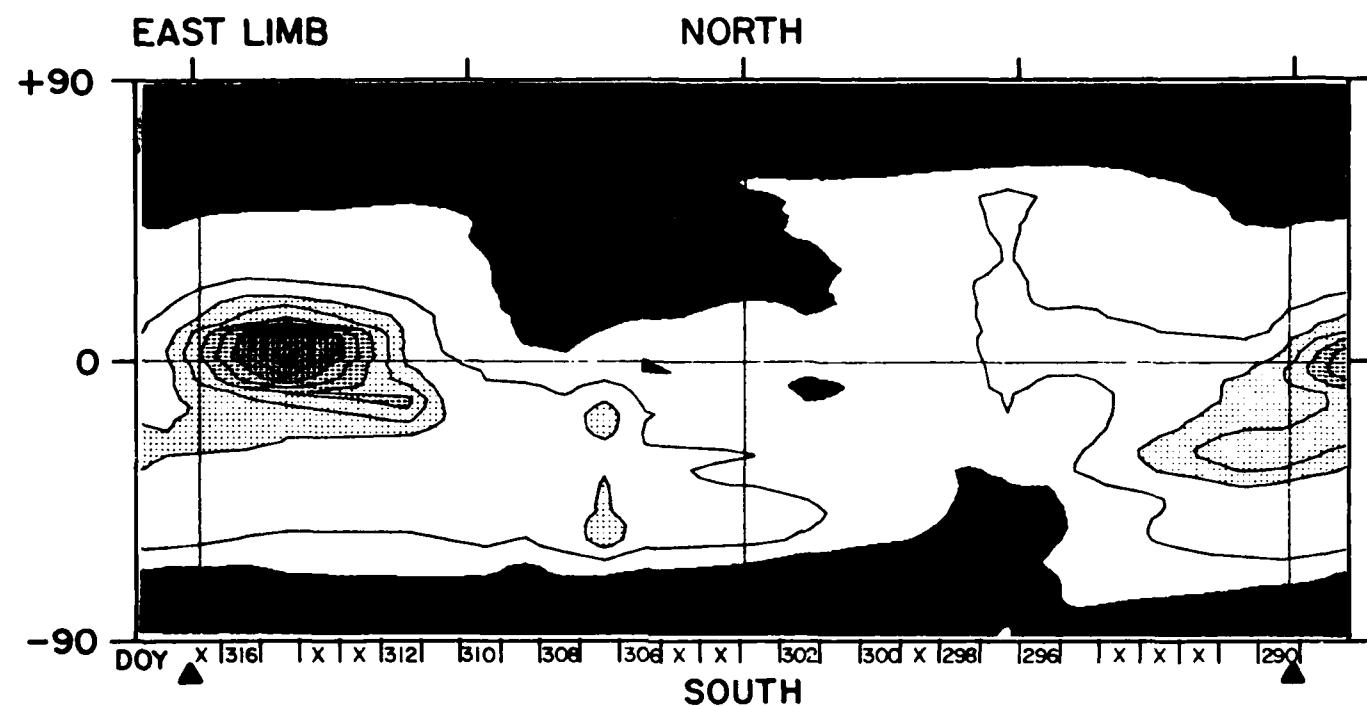
0 4 8 12 16 20 24 28 MIL

X = NO DATA

# NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1768 HEIGHT 1.15 R<sub>⊕</sub> YEAR 1985



0 4 8 12 16 20 24 28 MIL

X = NO DATA

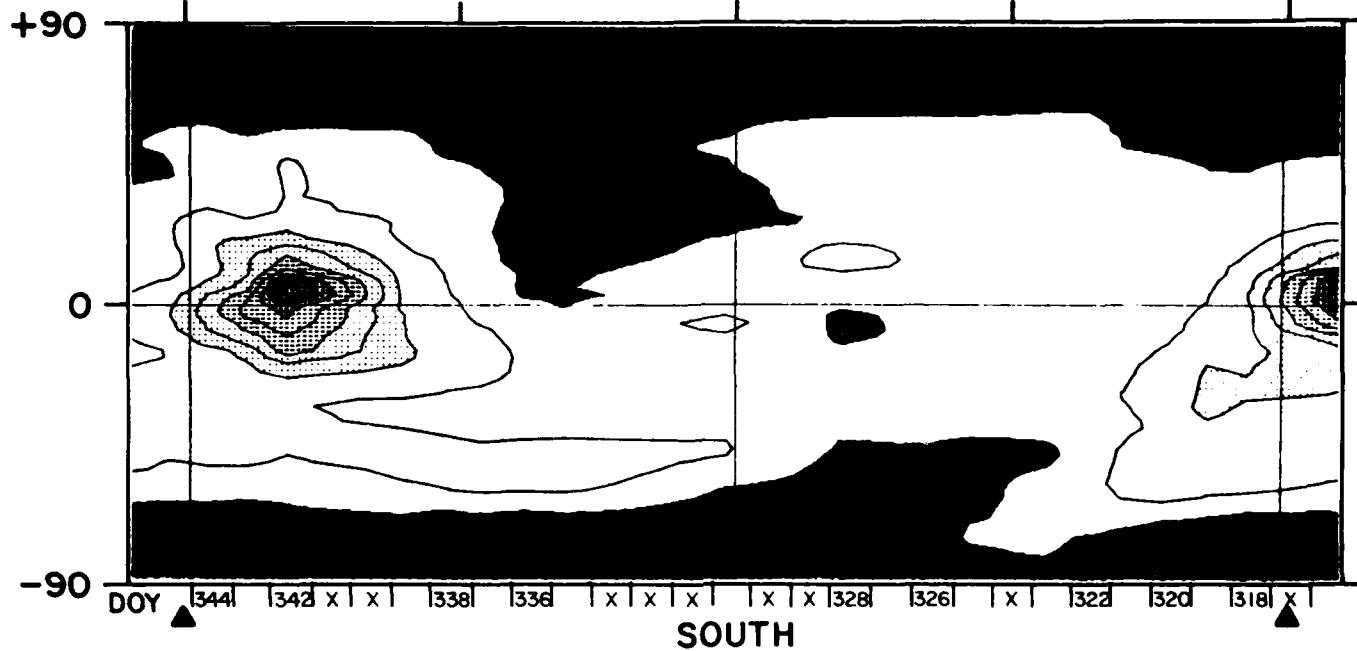
# NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1769 HEIGHT 1.15 R<sub>⊕</sub> YEAR 1985

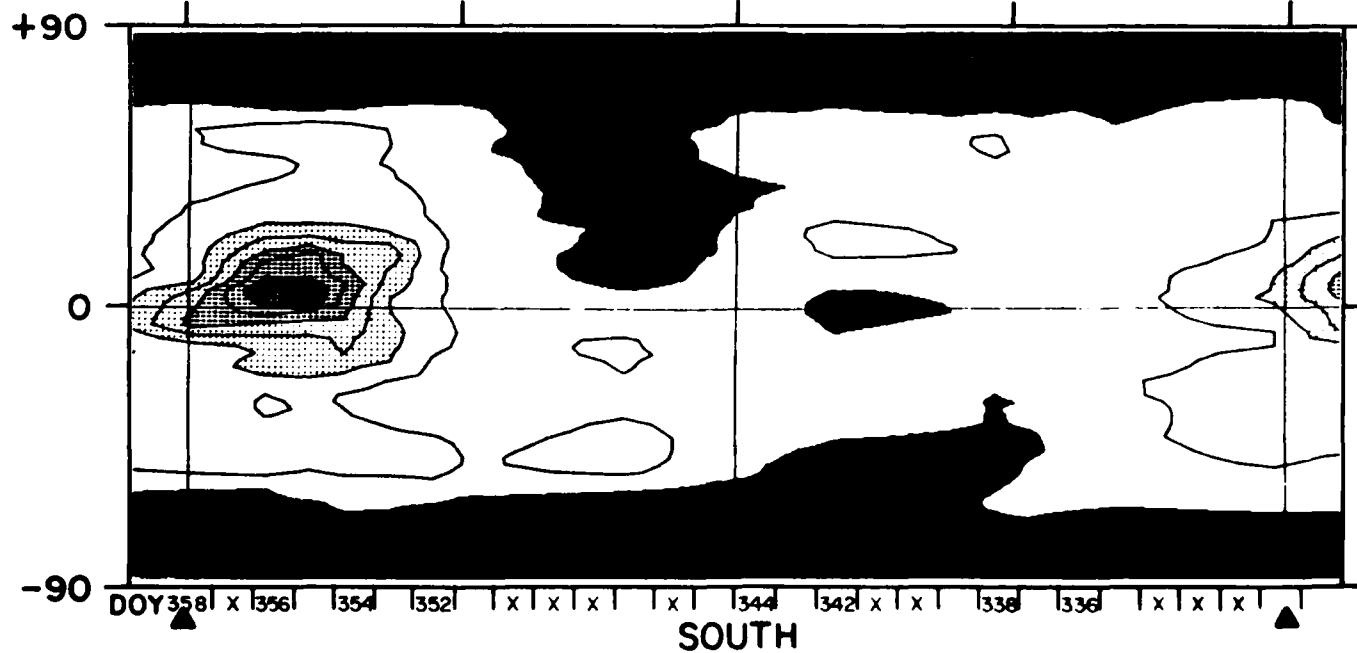
EAST LIMB

NORTH



WEST LIMB

NORTH



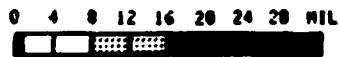
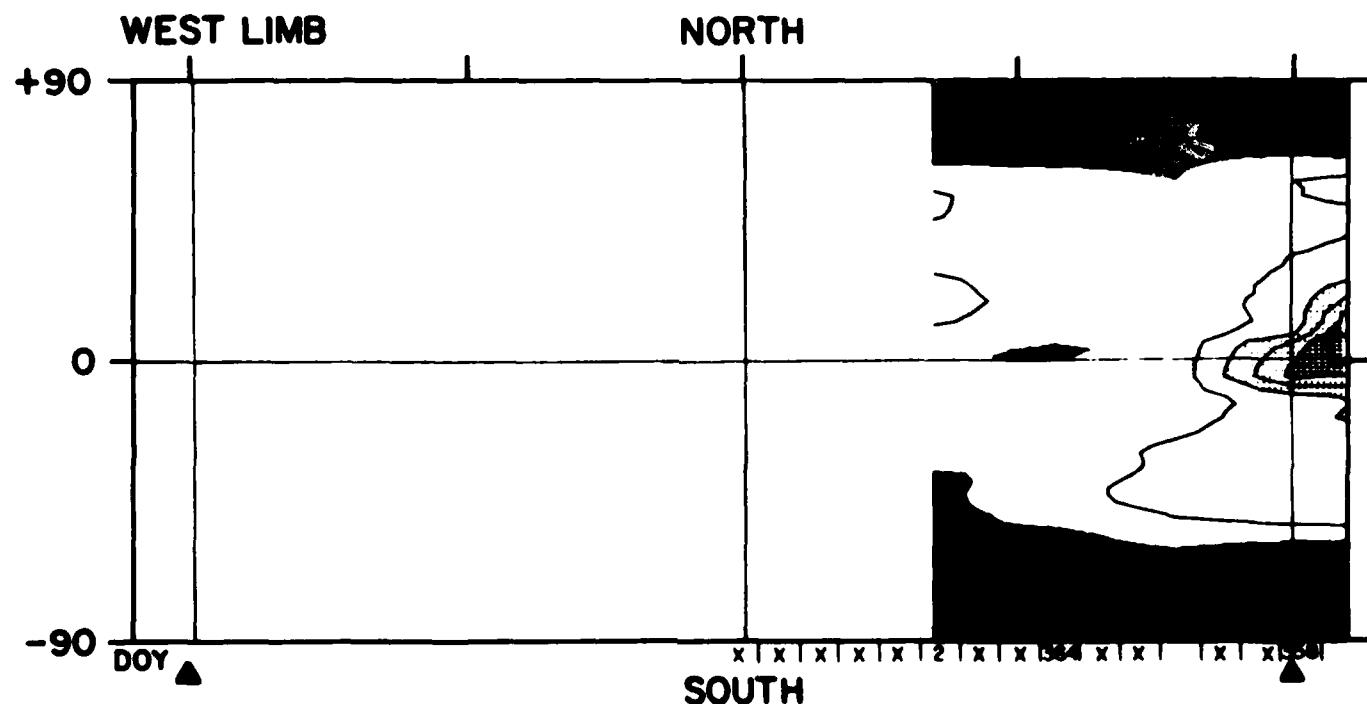
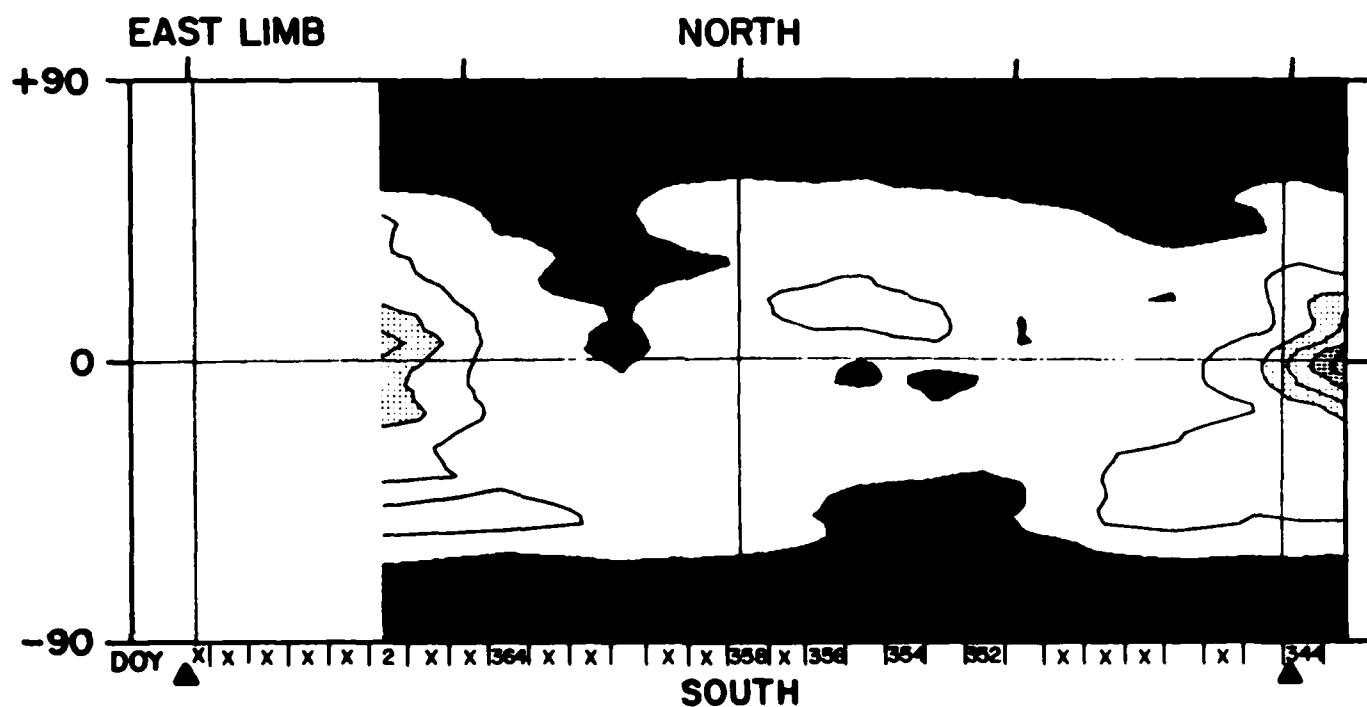
0 4 8 12 16 20 24 28 MIL

X = NO DATA

NATIONAL SOLAR OBSERVATORY, SACRAMENTO PEAK

Fe XIV, 5303 Å CORONAL PHOTOMETER

ROTATION 1770 HEIGHT 1.15R<sub>sun</sub> YEAR 1986



X = NO DATA

## V. REFERENCES

Altrock, R. C. and L. B. Gilliam, Coronal Line Emissions (Sacramento Peak), Solar Geophysical Data, Prompt Reports #391 et seq., U.S. Dept of Commerce, Boulder, Colorado, (1977-1985).

Fisher, R., A Photoelectric Photometer for the Fe XIV Solar Corona, AFCRL Instrumentation Paper #205, 1973.

Fisher, R. and S. Musman, Detection of Coronal Holes from  $\lambda$  5303 Fe XIV Observation, Astrophysical Journal, 195, 801-803, 1975.

Fisher, R. R., R. Lee, R. M. MacQueen and A. I. Poland, New Mauna Loa Coronagraph Systems, App. Optics, 20, 1094-1101, 1981.

Fisher, R., C. Garcia, E. Lundin, P. Seagraves, D. G. Sime and K. Rock, The White Light Solar Corona, An Atlas of K-Coronameter Synoptic Charts December 1983 - January 1985, Technical Note NCAR/TN-246+STR, NCAR, Boulder, Colorado, 1985.

Smartt, R. N., Solar Corona Photoelectric Photometer Using Mica Etalons, Instrumentation in Astronomy IV, Proceedings SPIE 331, D. L. Crawford, ed., p442-447, Tucson, Arizona, March 8-10, 1982.

#### ACKNOWLEDGMENTS

Assistance in data reduction has been provided by Howard DeMastus, Cheryl Brown-Hill, and John Cornett, while the design of and reduction of the data to the synoptic map presentation is due to P. H. Seagraves. C. Garcia, E. Lundin, and E. Yasukawa assisted in producing the maps. The data described in this Note were collected at the Sacramento Peak Facilities of the National Solar Observatory, which is operated by the Associated Universities for Research in Astronomy Inc., under contract with the National Science Foundation (NSF). Partial support for the National Solar Observatory is provided by the United States Air Force under a Memorandum of Understanding with the NSF. The High Altitude Observatory is a division of the National Center for Atmospheric Research (NCAR) which is sponsored by the NSF. Helpful comments on the manuscript were provided by Keith Pierce and B. Lites and valuable editorial assistance was provided by C. Rasmussen.